Smithsonian

May 1982

Eskimo artist represents
the spirit of a bear by
a face within a mask (p.50)

Now...an exact 22kt gold replica will be created for each new U.S. Commemorative Postage Stamp!

22kt Gold Replicas of United States Stamps

Exact replicas on a gleaming surface of real gold.

Under a non-exclusive licensing agreement with the United States Postal Service, the Postal Commemorative Society is proud to make available an authentic replica of each new U.S. Commemorative Stamp—recreated to exacting standards, with high-relief sculptured detail on a flawless, mirror-smooth gold surface. Accompanying each mint-perfect replica is the actual stamp, cancelled with the Official First Day of Issue Postmark. The result is a collectible of unsurpassed meaning, beauty, and importance. And, if you reply promptly, you have the opportunity to start your collection at the favorable issue price of just $5.50 each.

Nothing captures the grandeur and the glory of this land like America's stamps. For here is where we honor the men and women who made this nation great—Presidents, patriots, pioneers...inventors, explorers, authors and athletes...crusaders for justice and guardians of liberty. Our spirits swell with pride as we experience the high points in our history—victories won, challenges met, visions fulfilled. Our hearts rejoice in America's beauty—flowers, wildlife, works of art and architecture, wonders of nature stretching from sea to shining sea. Our affection for America deepens—in tributes to our customs and folklore, institutions and ideals.

For all these reasons, collectors by the millions look forward to each new commemorative issue of the United States. Each new stamp is a patriotic treasure—a symbol of American pride, accomplishment, and tradition. Each new stamp is also an original work of art in its own right—created by one of our country's finest living artists.

Imagine the excitement, then, when each new stamp is immortalized on a gleaming surface of 22kt gold—an exact replica, struck to uncompromising standards and preserved in mint condition as part of a luxurious, limited-edition First Day Cover. Imagine, too, the opportunity to own rare and beautiful gold stamps at the low price of just $5.50 each.

Each 22kt gold stamp replica will be authentic down to the smallest detail.

For each new U.S. Commemorative Stamp that is issued, the U.S. Postal Service makes available a photograph of the original design. From this photograph, a number of painstaking steps must then be taken to recreate the stamp on thin sheets of paper-backed 22kt gold precisely to the original's size, shape, and official design.

First, the skilled craftsman must hand-inscribe every line and stroke of the original in raised relief upon a master model. After careful inspection and approval, the highly-polished die created from the master will then be used to strike the 22kt gold surface in a flawless, proof-like finish—just as if one were producing a magnificent medal or coin. The result will be a replica that is faithful to the original—and yet different. A dramatic, three-dimensional, frosted sculpture standing in high relief on a mirror-smooth surface of gleaming gold!

And, much in the manner of a precious medal or coin, each proof-like gold replica will be displayed against a rich velvety background. Moreover, it will be preserved forever in mint condition within a clear protective capsule. Thus, the immaculate surface of the gold stamp replica is forever shielded against dust, loss, or harm from fingerprints – a perfect specimen for your children, your grandchildren, and their children to enjoy in years to come.

The actual First Day of Issue Stamp will attest to the faithfulness of the replica!

Perfectly complementing the gold stamp replica and attesting to its faithfulness will be the stamp itself. As you examine the intricate details on both the stamp and its replica, you see how perfectly the two correspond! In each case, the actual stamp will bear the Official First Day of Issue Postmark of the designated post office of first issue. These postmarks will certify that these gold replica-bearing First Day Covers can never again be issued.

A custom-crafted collector's album will showcase your covers to best advantage.

A luxurious collector's album will be custom-crafted for you. Your name will be stamped in gold on the front cover. Inside, transparent vinyl pockets will display each cover, with its gold stamp replica, to best advan-

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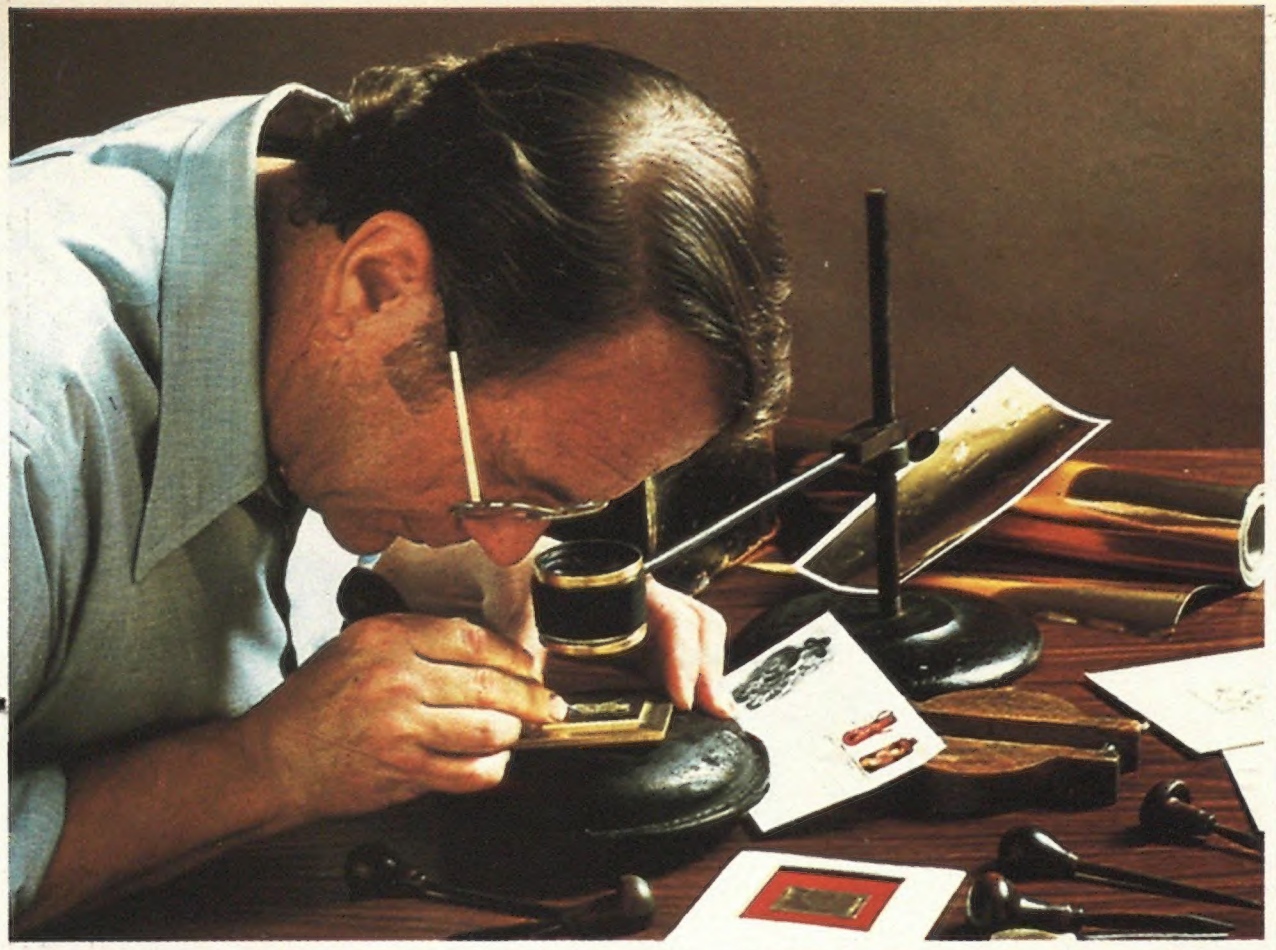

A final striking is inspected to insure that it meets the high quality standards established for 22kt Gold Replicas of United States Stamps.

ABOVE: A skilled engraver puts the final touches on the brass master model from which 22kt gold stamp replicas will be produced.

Shown here are a master model (center), engraving tools, and sheets of 22kt gold foil from which gold stamp replicas will be created.

Covers shown smaller than actual size.

American Architecture Series
University of Virginia Rotunda

The 1980 Winter Olympics
Slalom Skiing

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NOTE: The stamps and replicas shown in this presentation are from past issues and are shown for illustrative purposes only. You will receive replicas of future U.S. Commemorative Stamps as they are issued.

tage. You may slide each cover from its pocket for closer inspection and still not worry about the replica itself—it will remain sealed within its clear protective capsule. You can imagine the many rewarding hours you and your family will spend enjoying the collection.

Subscribe now for a favorable issue price.

Subscribing before the end of the current enrollment period guarantees that you will be enrolled at the favorable issue price of just $5.50 per cover. This price includes the gold stamp replicas, the protectively sealed capsules, the First Day of Issue stamps, the Official First Day of Issue Postmarks, and the display pages. There is no extra charge for the personalized collector's album with clear vinyl pockets.

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FIRST DAY OF ISSUE

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OFFICIAL FIRST DAY OF ISSUE POSTMARK, certifying each cover as an Official First Day Cover, which can never again be issued.

Stamp Design ©1979 U.S. Postal Service

Subscription Application 0844

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Signature _____

Allow 10 to 12 weeks for shipment of initial set.

May 1982

Smithsonian

Volume 13, Number 2

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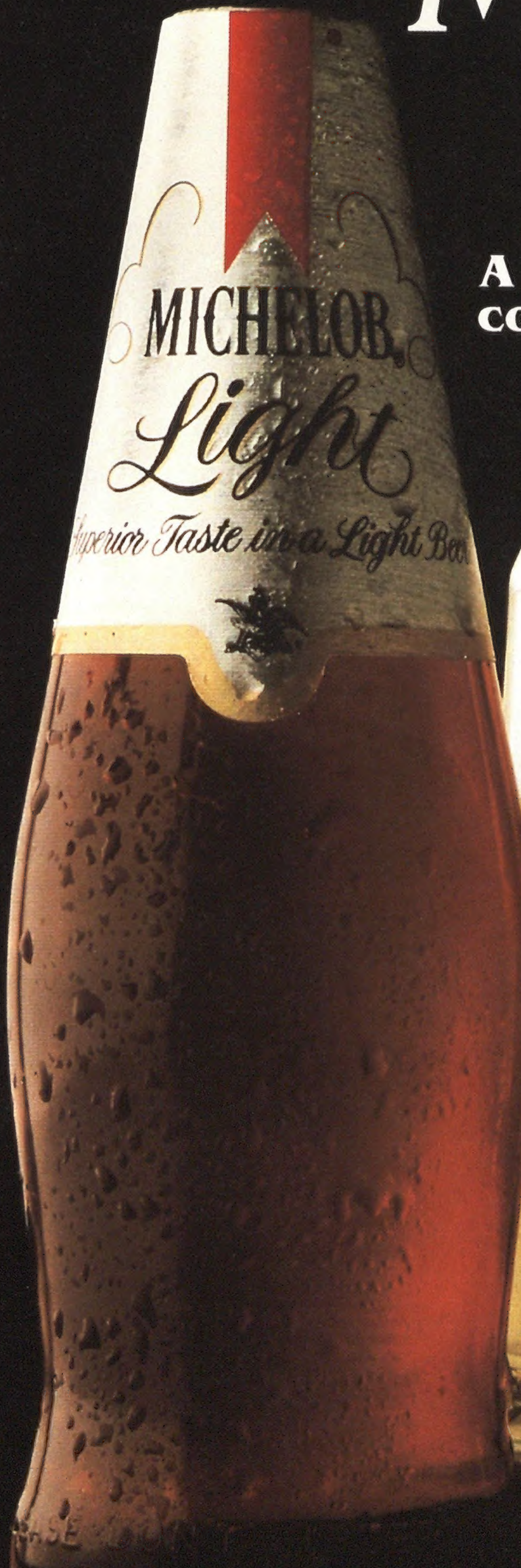

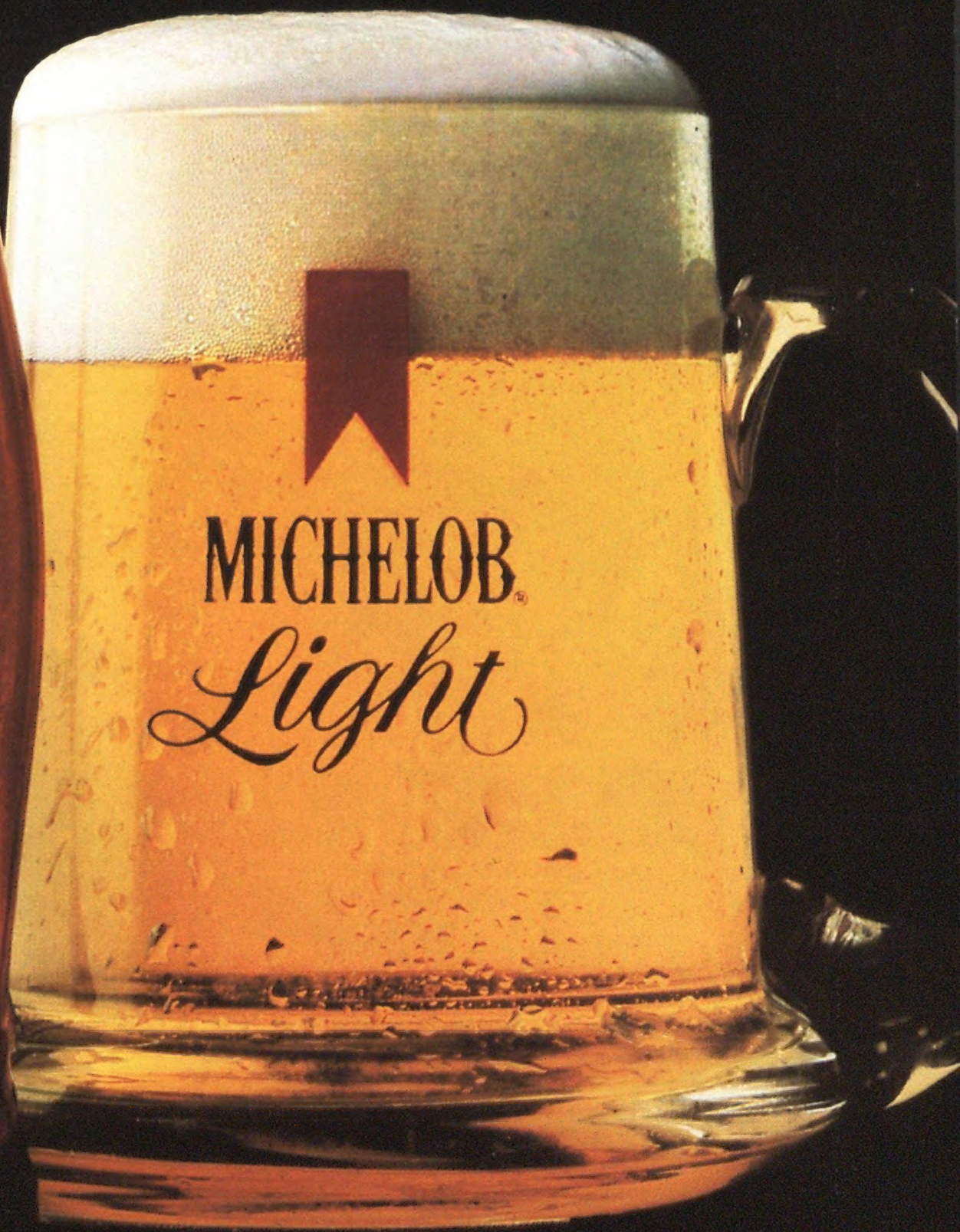

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Photographed in Burghausen, Bavaria.

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28

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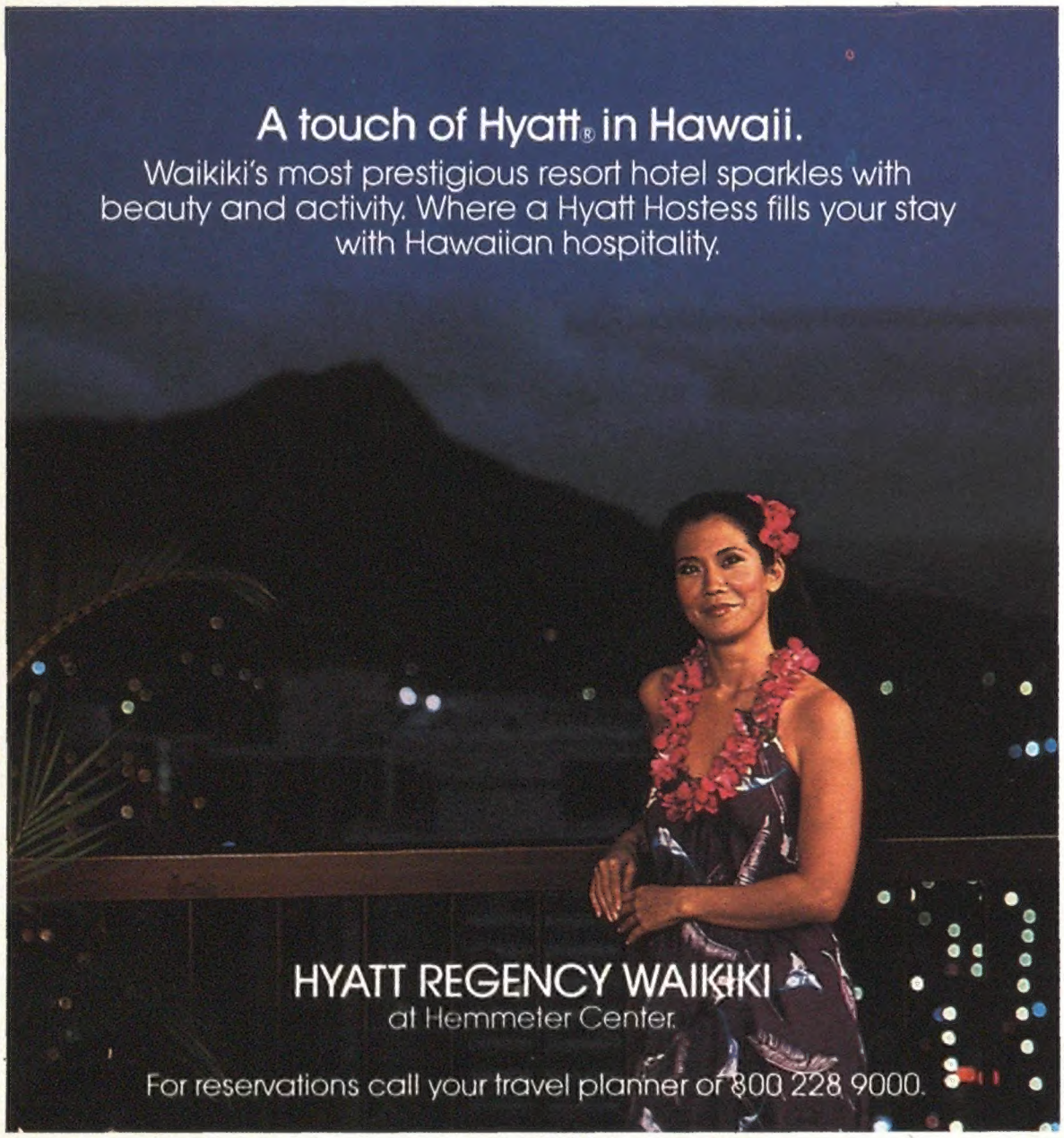
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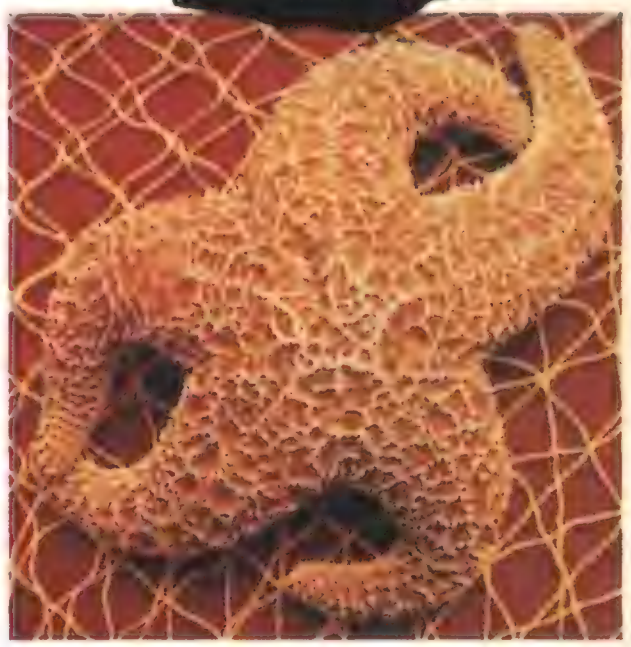

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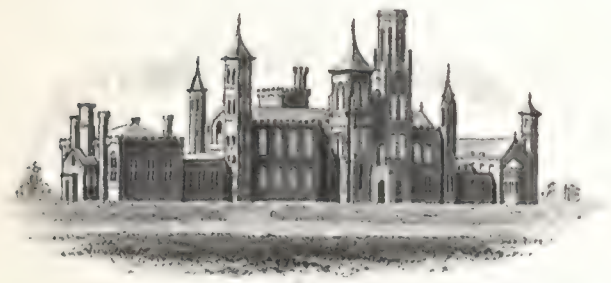
Secretary Ripley's comments

The view from the castle



The Smithsonian awaits the summer influx of visitors, whose enthusiasm renews and confirms our confidence in the Institution

We are approaching the peak times of the summer tourist inundation of Washington. It may begin in February, with any letup in the weather. From time to time in late winter there will be a day of full sun, marked by a line of panting buses on Madison Drive, steaming in the breeze, gasping out their exhaust fumes mixed with the rumble of their air conditioning—a kind of mechanized asthma.

Out of these monsters—tentatively in February, cautiously in March, carelessly in April—pour immense clutches of young adults, blue-jean clad, fluffy-haired, hands tucked in each other's hip pockets, boys and girls of junior or senior high school age from all over America. As the wind blows north or south, they parade across the Mall, vibrant with careless life; weaving among the circling ring-billed gulls, pigeons and joggers; uncaring and caught up in the incipient rituals of spring and being away from home with their own age group. An age group becomes less important as life goes on, until perhaps in later years when the pattern reemerges. So we see our visitors on the great Washington Mall, segregated in group tours of teen-agers and septuagenarians.

By May it is coming into full swing. The music of the carrousel rings out over the grass. Young lovers sprawl; even the gulls have flown off to the marshes for private reconciliations of their own. Groups from everywhere have taken over, and campers and vans have joined the lines of belching buses.

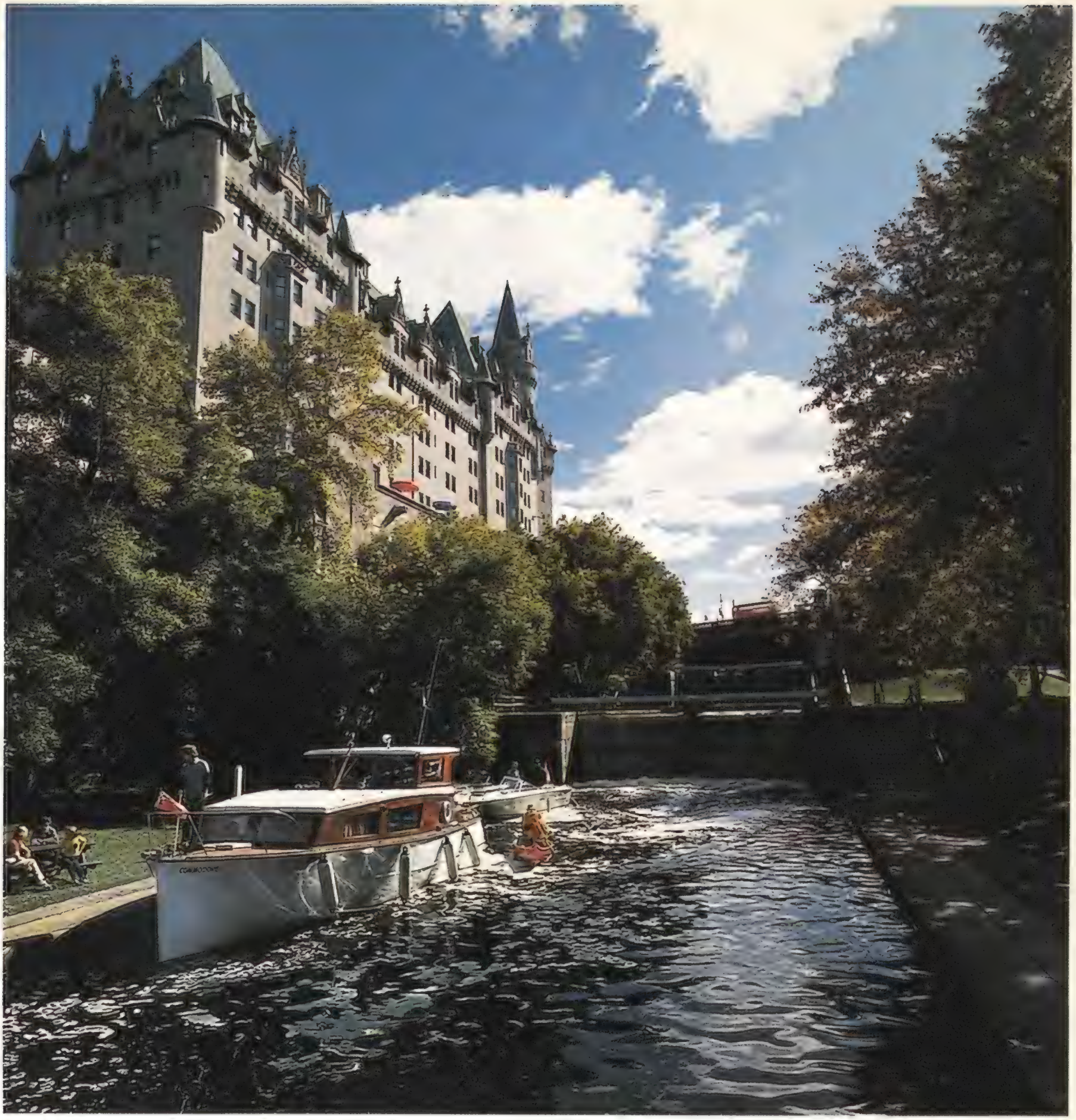
This summer we will again be joyously overrun by all of you, whoever you are, from wherever you come, at the rate of nearly a hundred thousand a day. This year our summer hours have been drastically cut by budgetary stringency, but the National Air and Space Museum will be open in the evenings again, as indeed it should be—the most popular museum in the world. This country deserves the NASM, and long may its flag wave!

Why shouldn't we realize that Americans are proud of being Americans and that one of our proudest boasts, aside from that of what we are and what we stand for, is that we virtually invented "air and space"?

By the time the spring frenzy begins, the Smithsonian is prepared for the throngs of visitors. Preparations have been going on throughout the year. In a typical summer month, more than 83,000 free brochures are distributed. The museum shops, particularly in NASM, do a land-office business in such exotic items as packets of freeze-dried ice cream, the kind the astronauts use (159,000 a year), and of course in model planes, kite kits, objects associated with the history of flight. Few stop to reflect on the amount of food that disappears on a 100,000-visitor day (mostly, I suspect, eaten by persons under 20): more than 4,500 cheeseburgers, 4,000 hamburgers, 20,000 orders of French fries (God save us!), 2,000 orders of fried chicken—and all of it washed down with nearly 14,000 soft drinks.

And so the dream of Washington, of our capital, of the epic tour to the triumphs of the past, reawakens in us a vision of youth and innocent enthusiasms and awe. It is May, and as the flags wave over the Mall, we too are renewed and our confidence in the Institution is reconfirmed.

S. Dillon Ripley



Ottawa, Ontario/Canada

Room with a view

It's called a château and looks like a castle, but it's actually a hotel and please be our guest. Canada's capital abounds with far-away feelings from double-decker bus tours and sedate canal cruises to Changing the Guard on Parliament Hill. The splendours of our heritage are yours to discover in Ottawa, Ontario/Canada. Treat yourself royally! Call TOLL FREE 1-800-828-8585 or from New York State 1-800-462-8404 or write: Ontario Travel, Queen's Park, Toronto M7A 2E5, Ontario/Canada.

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Q: Is evolution a slow—and steady—thing?

A: Maybe not. New research indicates that species may go for long periods without evolving at all. Then—very rapidly, by geological standards—evolution may occur, after which there is again little change. See *The New Evolutionary Timetable.*

Q: Is man the smartest animal?

A: *We* think we are. But dolphins not only have brains similar to ours—they actually have more cortex left over for higher mental processes. But what the dolphin does with its generous helping of cortex remains unknown. See *Life in Darwin's Universe.*

Q: Does it still take a human to design a computer?

A: No. Today computers can be programmed to create other computers. This "compounding" of computer wisdom and capabilities could have a profound influence on our society. See *The Electronic Cottage.*

---

170 The Mapmakers
John Noble Wilford
(Pub price $20)

203 The Electronic Cottage: Everyday Living with Your Personal Computers in the 1980s. Joseph Deken
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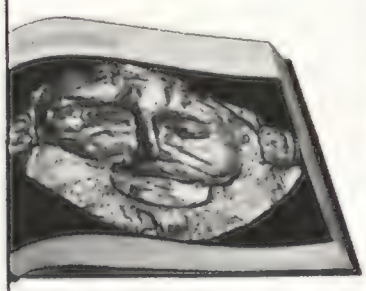

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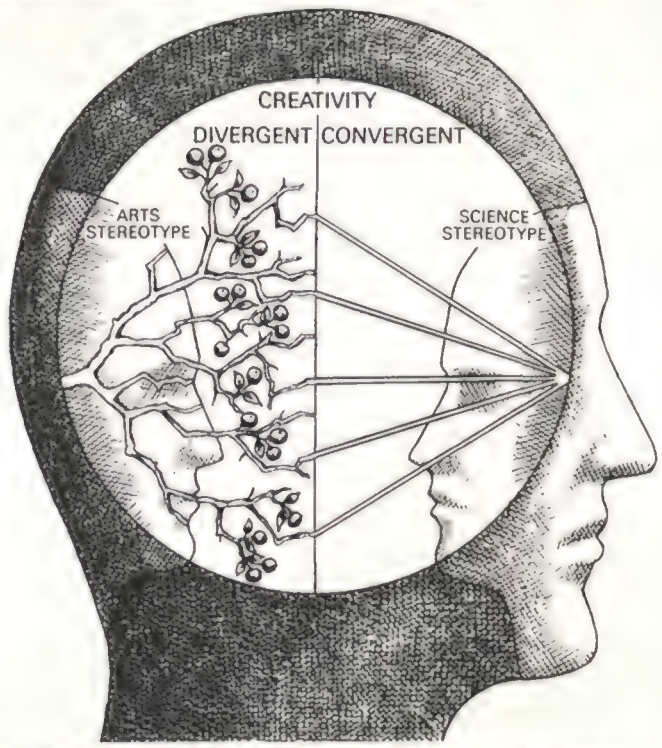

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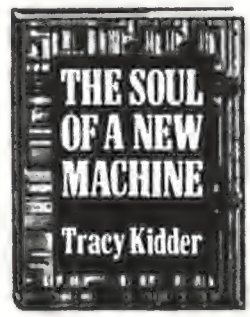

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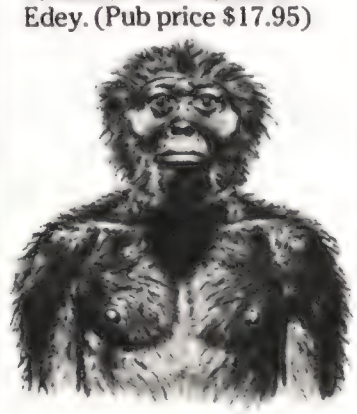

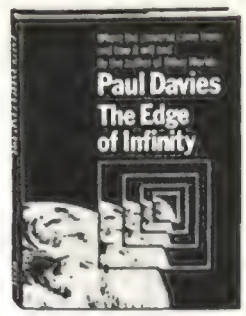

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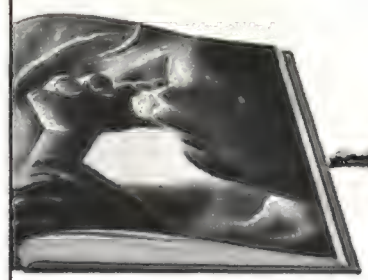

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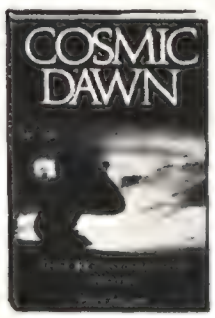

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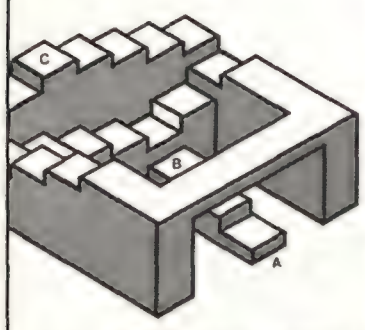

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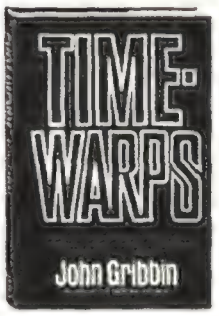

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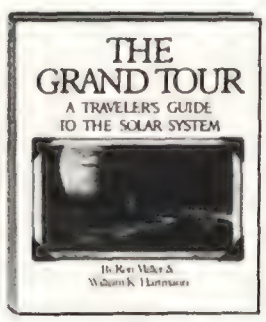

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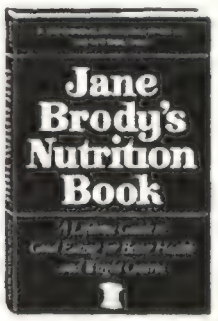

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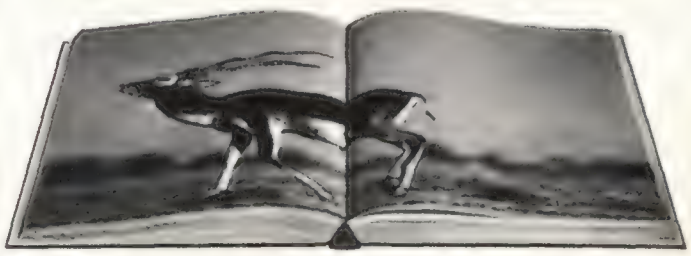

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Letters to the Editor

Ode to March

Dear Sir: Your March 1982 issue gave me a lot of pleasure. First, the article about Samuel Yellin was an inspiring version of the immigrant story from my grandparents' own Galicia. Then in "song slides" there was an illustration of a song my grandmother used to sing, "A passing policeman/Found a little cheeiuld. . . ."

Next, I was reassured no end to learn that some of the fine modern scientists engaged in creating and populating the mythical planet of Thraxisp wondered if they were losing their marbles indulging their hobby. The real world being what it is, I guess no hobby can be considered nutty if it gives you a handle with which to play a little.

I'd like to have climbed the Natural History Museum dome with you, too, and seen that hall of musty bones. We must all have the feeling we knew poor Yorick or we wouldn't be such fans of that great warehouse of dusty skulls and space-age gadgetry, the Smithsonian Institution.

Joan Frances O'Brien
St. Charles, Illinois

Henry Alexander

Dear Sir: As a student of art history and an artist for some 18 years, I believe I can shed some light on the artist Alexander's "disturbing ghost imagery." The 19th-century French realist painter Gustave Courbet was in the habit of painting imagery over a dark background to produce a special effect. After a period of years, colors began to lose their opacity and became increasingly transparent, allowing the dark background to show

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through. In *The Old Man's Pleasure,* Henry Alexander added the cockatoo to an already completed and dry area of the painting—the rendering of the dark-hued window casing. Over the years this dark color has begun to predominate over the lighter hue of the cockatoo. The same can be said for the boy and stuffed heron in *The First Lesson*. One hopes that today's paints will help to prevent this unsought occurrence.

Douglas C. Scribner
Chepachet, Rhode Island

Dear Sir: How wrong you are in stating that Henry Alexander's life "will continue to be largely an enigma." His splendid paintings make his 35 years come startlingly to life. Indeed, *The Lost Genius* alone captures his entire life. Note there are no admiring crowds outside the cobbler's doorway, only a lad—an urchin —with soulful eyes, under the spell of the melodious strings. Each stroke of his brush, so meticulously and magnificently executed, bespeaks longing for the recognition which in life was denied him.

Aurora Saucedo
El Paso, Texas

Thraxisp

Dear Sir: There is a theory that whatever the mind of Man can conceive exists somewhere in our universe. Accordingly, the concept of Thraxisp points to indications of that planet's existence.

Thanks to its creators, I can now indulge freely my favorite theory that by relaxing in my armchair and concentrating on Thraxisp or any other place, I can transport my mentality there at will.

However, one more excursion into the world of imagery remains for your clever inventors, and that is a means of making my presence known to the intelligent inhabitants of planet Thraxisp. The problem of interstellar communication will then be neatly and permanently solved.

I am waiting breathlessly for this to be accomplished. But hurry, gentlemen. I am 86 years old and cannot wait as long as I did for my visit to Saturn.

Benjamin Phillips
Bay Harbor Islands, Florida

Samuel Yellin

Dear Sir: Your article does much to bring belated recognition to one of the finest

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Spanning more than a decade of work, his rich assembly of ironwork in the Washington Cathedral is outstanding. His screen enclosing the Holy Spirit Chapel challenges and rivals any of the great Spanish ironmasters or Tijou's work in England. It may interest your readers to learn that beyond the Chapel of St. Joseph of Arimathea [shown below, with its Yellin gates silhouetted] is the Columbarium, wherein are interred the ashes of Helen Keller, her lifelong companion Anne Sullivan Macy and other notables.

Richard T. Feller
Washington Cathedral
Washington, D.C.

Dear Sir: It so happens I worked for Mr. Yellin from January 1928 until his death in 1940 and with his son Harvey from 1946 until I retired in 1974. I started out as office boy at $10 for a 44-hour work week. Mr. Yellin was like the conductor of an orchestra. As a great craftsman himself, he watched every little detail as work would progress from scale sketches to the finished product. He had little regard for the full-size shop drawings, except for measurements and the general scheme,

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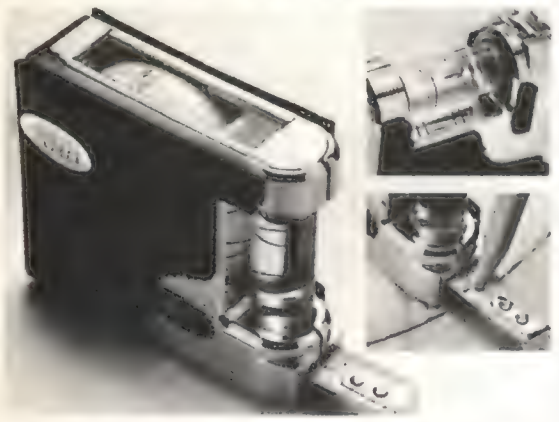

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When I first went to the shop there were approximately 250 men working for him. He would go out into the shop to watch over what they were making, because he insisted: "Though many men are working on a large project, it must look like one man made it."

There is one story of a contractor who complained to the architect that what Mr. Yellin had sent was not like the drawing, to which the architect replied: "If it is not like the drawing it must be better."

It is with fond memories that I write the above. I never made much money but I had a good time, and Mr. Yellin permitted me to travel at my own pace.

Dayton E. Froelich
Souderton, Pennsylvania

Nickelodeon days

Dear Sir: I was astounded and delighted to see on the cover of your March issue a picture of my friend Priscilla Dean Arnold, still very much with us, a lively, lovely lady who enjoys life to the fullest.

Gerald Hamm
Glenside, Pennsylvania

Dear Sir: John W. Ripley's article on the old illustrated songs of my boyhood gave me untold pleasure and your mention of Anita Stewart conjured up an amusing memory. She was in a picture, made in part at the New Amsterdam Theater, in which I was an extra in 1923. I recall the director asking her, "Will you throw away that gum during the shooting?"

Carl D. Short
Santee, California

Dear Sir: My father, a Methodist minister, left me 2,000 slides and a stereopticon projector, which he used to attract, interest and educate his parishioners.

The collection includes excellent pictures of the life of Christ in art, illustrated parables and hymns, and several series revealing the evils of drink.

Included are popular song slides, illustrated with live models, such as the 1911 *I'll Be with You When the Southern Roses Are in Bloom,* and another of 1910, *I'm Looking for a Dear Old Lady.*

Now retired, I followed my father's footsteps into the ministry. I found many of the slides useful in my work.

Nobel M. Rompel
Lakeside, Ohio

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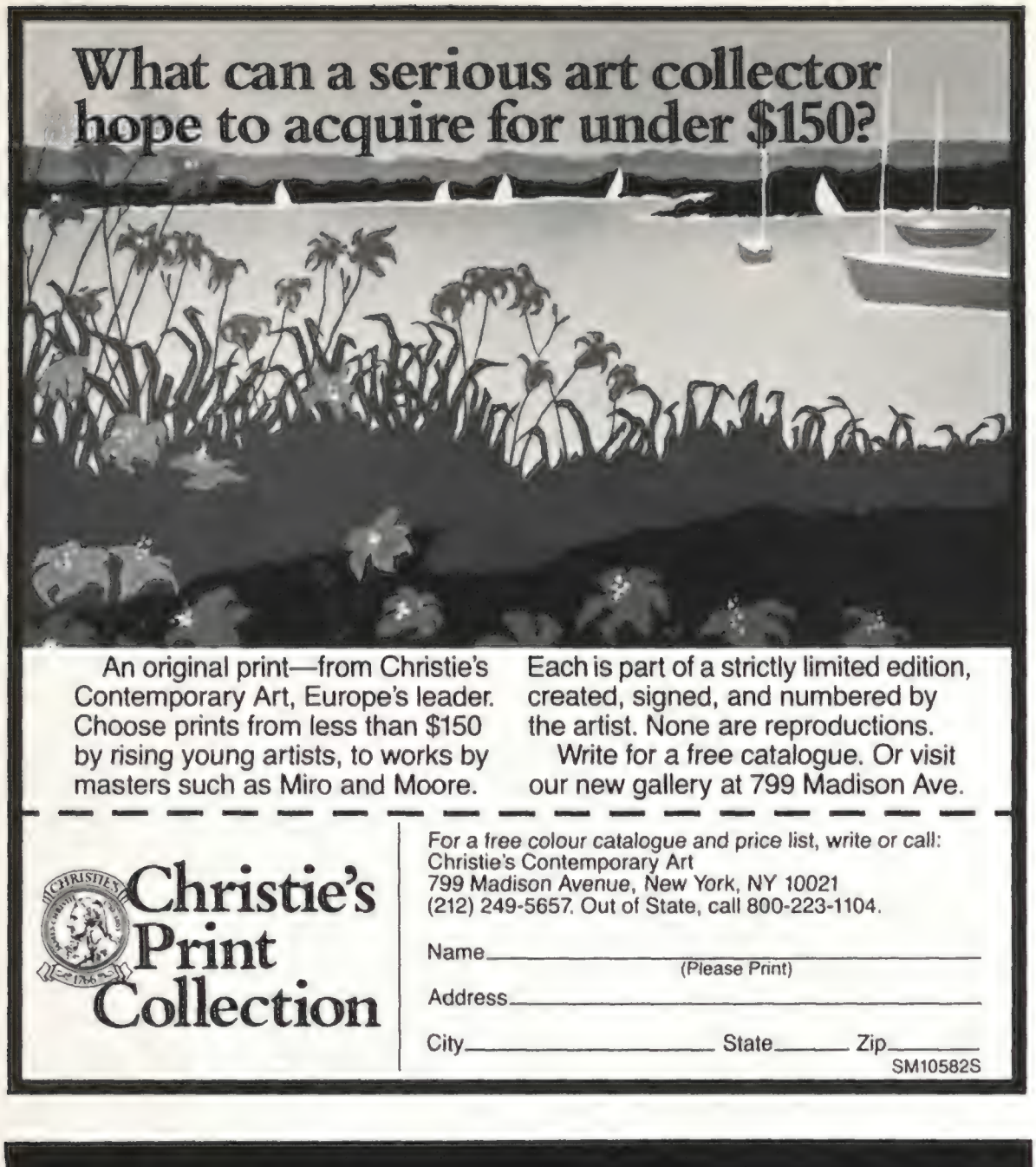
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Dear Sir: Your article is of particular interest to us because in the early 1900s my mother, father and aunt posed for song slides and postcards by Scott and Van Altena. Mother celebrated her 93rd birthday on March 5 and enjoys talking about the good old days when she worked with Lillian Walker, Anita Stewart and others. She earned $5 a day, very respectable pay back then and, as she says, "No contracts, no taxes and a lot of fun." But her father insisted on meeting and approving everyone for whom she posed.

Rose M. Barber
Mentor, Ohio

Acropolis

Dear Sir: The outstanding article on the Acropolis needs one technical correction. Titanium is not "an alloy with the same density and weight as aluminum." The more common titanium alloys are approximately 60 percent heavier than aluminum.

Wilbur Ott
Union Lake, Michigan

The conch

Dear Sir: I appreciate your fine article on the Caribbean conch by Carrol B. Fleming, but beg that the word "conch" which, as you point out, derives from the Spanish *concha*, be pronounced "conch" and not "konk"—which is something one should get over the head for saying it that way.

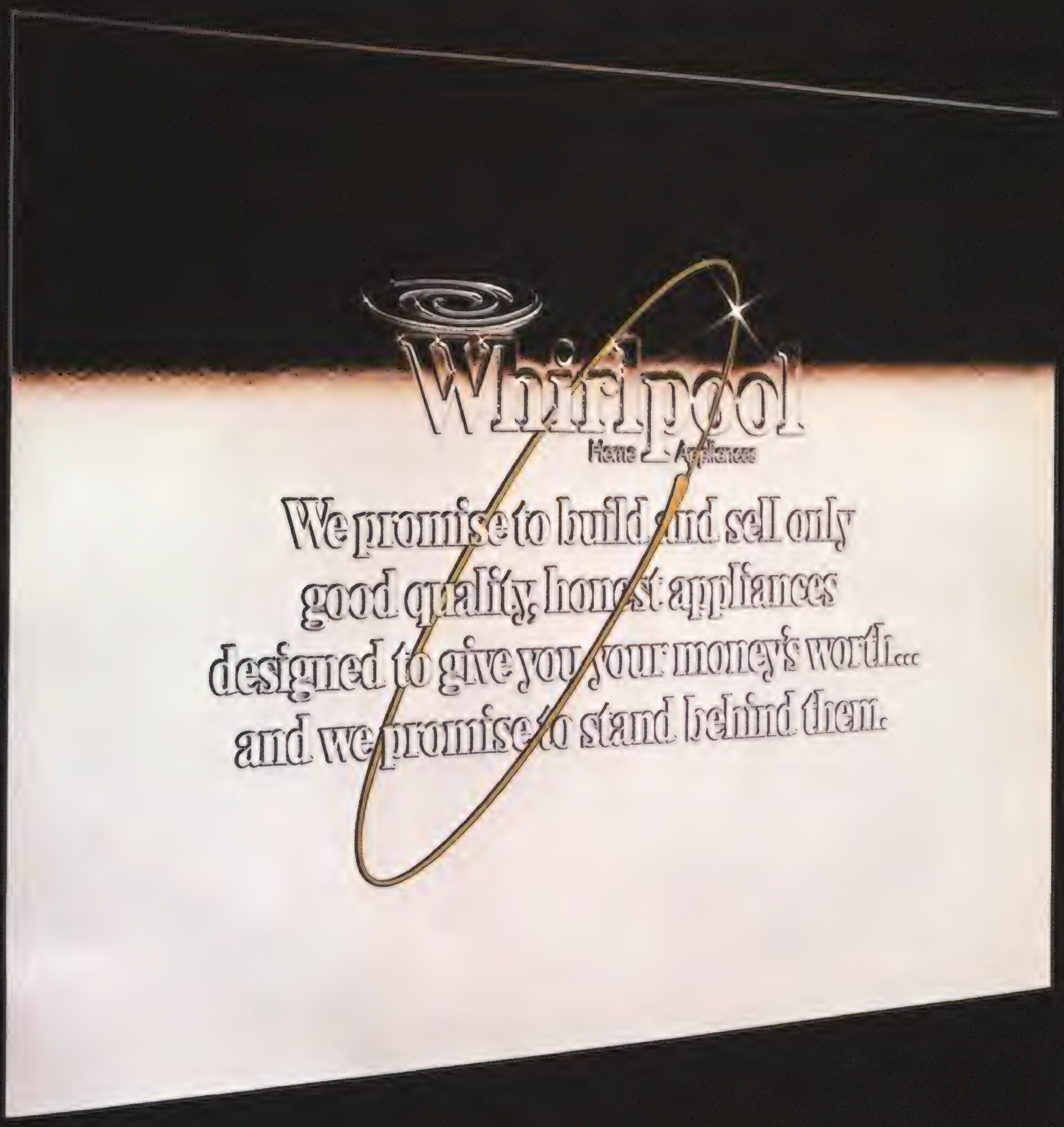
Frank Shiell
New York City

Phenomena

Dear Sir: In his splendid column John P. Wiley jr. cites the alarming estimates that a million species will become extinct by the year 2000, that we are already losing about one a day and that by 1990 the rate will have jumped to one per hour. What a staggering prospect!

Meanwhile, the world's human population continues to skyrocket. While spending a mere pittance to control population explosion and to protect the environment that nurtures all life, the nations of the world allocate some 520 billion dollars for military expenditures.

The last best chance for the survival of the human species is that people everywhere will finally come to recognize that all forms of life are interdependent and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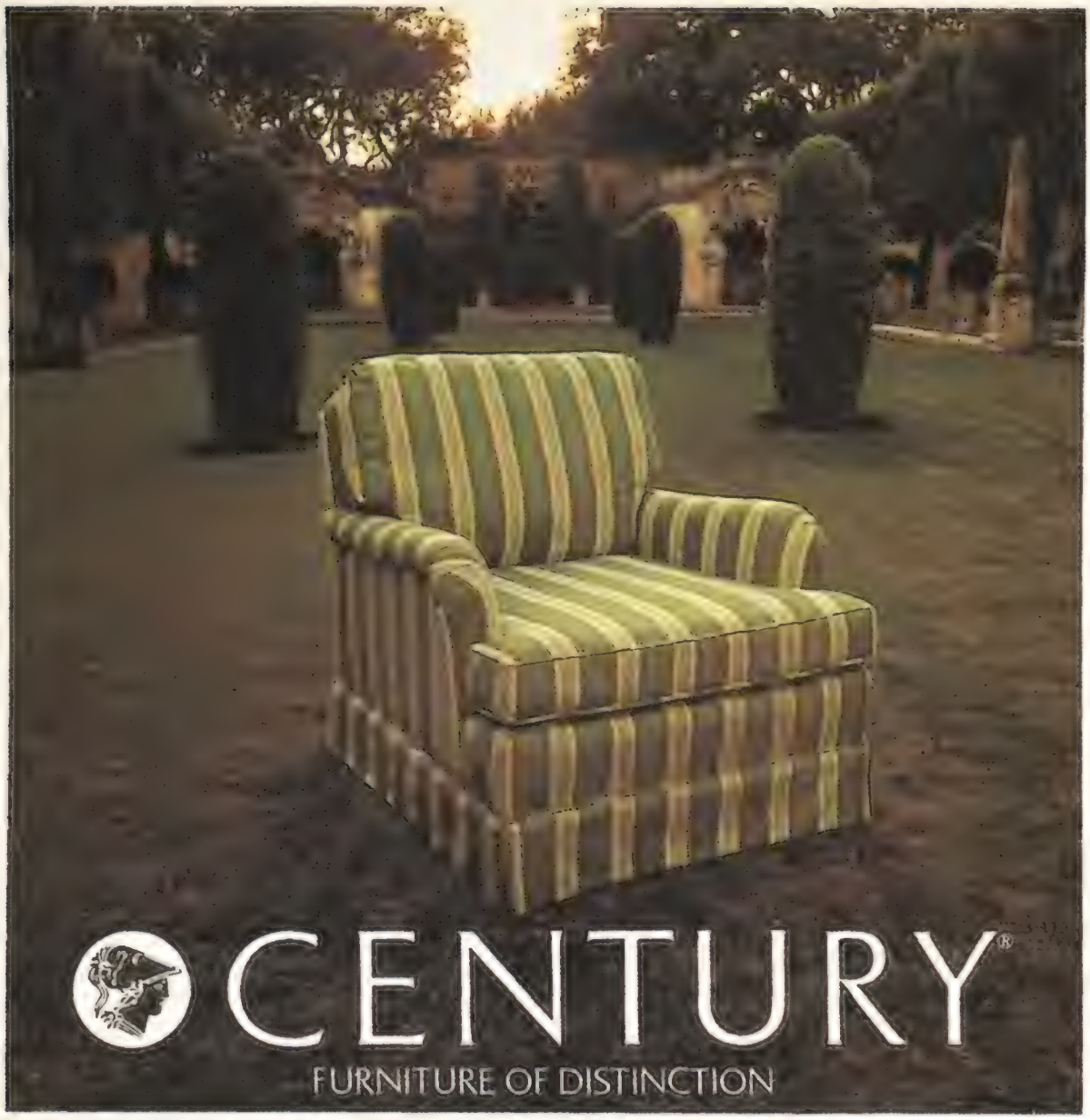

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that we must truly join efforts to preserve this marvelous planet, not only from nuclear destruction but also from uncontrolled exploitation.

Nature is teaching us a stern lesson. It is that we must save us from ourselves.
Nicholas C. Brown
Lancaster, Pennsylvania

Dear Sir: Speaking of endangered areas and species, you might like to know of efforts to preserve a remarkable wilderness—the Big Thicket National Preserve—in southeast Texas. Approximately 14,800 acres remain to be purchased out of the total authorized by Congress. Most border stream corridors that are important to the Thicket as well as to flood-control proponents, real-estate developers of attractive but flood-prone areas and others. Active opposition to acquisition has caused delay and escalated values. President Reagan has recommended including several million dollars for it in the budget for fiscal year 1983—only a tentative step on a long, hard road. It would be tragic if this area—which, according to Professor Thomas Eisner of Cornell University, has more biological diversity than any other of its size in the United States—were lost.
Mary Anna Anderson
Beaumont, Texas

Dear Sir: The enormity of the consequences to our planet as a result of mass extinctions is only now being perceived by the few who are actively concerned.

A broad coalition of conservationists and scientists, Save Endangered Species (P.O. Box 50771, Washington, D.C. 20004), has joined in recent months to raise a cry over loss of genetic diversity and to fight to protect the Endangered Species Act, the Convention on International Trade in Endangered Species and the other wildlife- and habitat-protection laws assaulted by special interests.
Craig Van Note
Washington, D.C.

Mall

Dear Sir: "Alex H. Stephens" has long been one of my favorite Georgians. Although physically small, he was highly principled and courageous, a giant intellectually, a statesman, constitutional scholar and advocate of peace, harmony and cooperation among the states.

Alex Stephens and his good friend U.S.

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And a good many of these newcomers claim to perform 'like' a BMW.

This sudden enthusiasm for BMW-like performance is rather amusing.

Because while it's possible to develop enthusiasm virtually overnight, the development of engineering takes considerably longer—a fact that's amply demonstrated by the BMW 320i.

THE BMW 320i VS. UNREASONABLE FACSIMILES.

The 320i is engineered according to a belief that hasn't changed for decades:

Namely, that performance is, and will always be, the ultimate measure of a car's worth—a belief that permits a car to grow by gradual refinement, instead of hasty responses to changing fashions.

The current preference for leaner, more efficient engines, for example, has caused no radical reshuffling of priorities at BMW. The 320i is powered by a 1.8-liter engine equipped with K-Jetronic fuel injection—and has been for years.

Nor has the 320i needed any instant re-engineering to deliver better mileage. It delivers an EPA-estimated 25 mpg, 36 mpg highway, figures that would be respectable even in an economy car.

(Fuel efficiency figures are for comparison purposes only. Your actual mileage may vary, depending on speed, weather and trip length. Your actual highway mileage will most likely be lower.)

In fact, despite all the flurry of emulation, the 320i—with its fully independent suspension, precise steering, and decades of technological refinements bred on racecourses—remains unique.

So much so as to awaken an almost unseemly ardor in automotive critics who are implacable for a living.

One nominates the 320i as "the sort of car enthusiasts turn into legend." He might have added that there are no reasonable facsimiles for legends.

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Originals generally bring their owners higher prices than reproductions. Which could help account for the following:

According to the January 1982 NADA Used-Car Guide, while the value of other cars was dwindling considerably, the average 320i sold over the past 3 years retained a phenomenal 96.9% of its original price.

All things considered, the appearance of so many BMW surrogates is perfectly understandable.

If you suspect you might not be content to spend the next several years with a surrogate, we suggest you contact your nearest BMW dealer for a test drive.

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Senator Robert Toombs sometimes engaged in heated debates. In one such, Toombs, in his deep, resonant voice, said to Stephens: "Why, you little shrimp, I could eat you in one bite and swallow you whole!" Stephens replied, "Then sir, you would have more brains in your stomach than you do in your head."
Ms. Robin E. Heard
Arnoldsville, Georgia

Dear Sir: In the wake of his hazardous and successful expedition to the dome of the Museum of Natural History, Director Fiske should consider the hazards experienced by those who constructed that dome without the fancy engineering aids of today's building industry.

I cannot help but wonder how many more frontiers will be discovered in the venerable pile of buildings I love to visit. Has anyone climbed the castle tower? What about dusting the inside of *The Spirit of St. Louis*? Any such would be the equivalent of a hazardous expedition.
Falconer Smith
Charles Town, West Virginia
Ted Park's perilous ascent of the castle tower in February's "Mall" was the first of his "high points at the Smithsonian." The Spirit of St. Louis appeared in his columns of October 1975 and May 1977, but on both occasions he was too awed to even contemplate dusting it. Ed.

Dear Sir: I read with fascination the climb into the museum dome. Even the photograph made me dizzy.

I couldn't discern the purpose of the ascent, but then I've never been able to comprehend my own compulsion to climb. Though my vertigo never decreases, climb I will, everything from the trees in our California backyard, when I was a child, to the Statue of Liberty to whatever dome, tower or hill was available on student travels through Europe. Once at the top I cower with eyes closed, clinging to whatever support the structure provides until I can summon up the nerve to descend.

My fondest memory of these climbs is of a tiny Italian friar who was descending the Duomo in Florence as we were on our way up. I heard: "When I [puff, puff] get my hands [puff, puff] on the d - - - - - fool who talked me into this [puff, puff]. . . ." The rest was lost, but I always wondered.
Kathy Sharman
Grandview, Washington

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Phenomena, comment and notes

Next time someone complains that life seems empty, explain that it could have been a good deal emptier

After a long day on a flat, solid and stationary world, I often like to stand outside on a spring evening, watch the stars come out, and remember where we are. All day the sun beats back our gaze; it is so bright we do not look up, but only around at each other and down at the ground. Five miles is considered good visibility. Then the sun sets, and when that first star appears, we are seeing hundreds of trillions of miles.

One by one points of light wink on. I have been watching it happen since childhood, yet something in my mind still starts when I see a star that just a moment ago was not there. The sky is still light; the first five or six come slowly, almost teasingly; then stars turn on faster and faster, gathering like timid animals that have decided they are safe. Darkness falls, and hundreds of lights dot the celestial sphere. Once again I am standing on a planet, hurtling through space, a part of the Galaxy.

The clearer the sky, the more stars shine in the soft blackness. Even in a suburb, hundreds speckle the night. Binoculars show thousands. The sky looks crowded with stars.

An astronomer can look at one of those points of light and know how big the star is, how old it is, what it is made of, how fast it is rotating and what its future is likely to be. He or she can also tell how far away it really is. Long before astrophysics became a glamour field, astronomers had

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found how far away the stars are. They are so far away from us, and from each other, that our minds cannot understand. The stars are not crowded. They are terribly alone.

In our part of the Galaxy, the typical distance between stars is about five light years, the 30 trillion miles or so that light would travel in five years. As pointed out in *The Cambridge Encyclopedia of Astronomy*, these distances are typically 30 million times the diameter of the stars themselves. If you were to take the diameter of the average person as one foot and spaced people as widely as the stars are, then there would be 5,680 miles between one person and the next. All our relatives would be distant.

My average speed going to work is about 30 miles per hour. Driving day and night, with no stops at all, it would take something like 114 million years to get to the next star. At the speed of a jetliner, I would still need more than six million years. Even if I could maintain the 25,000 miles an hour at which the Apollo astronauts began their lunar voyages, I would need 137,000 years. And this is just to get to the next star. To calculate the time to a star 100 light years away (still close—the Galaxy is 100,000 light years across), just multiply the above driving times by 20.

On a warm evening I look up at the stars and try to sense just how far away they really are. Betelgeuse glows red at the shoulder of Orion, a star so large that we can almost make out its disk from 620 light years away. I can see it so brightly, so clearly, and I can't get there. Ever. It is just too far away.

And this is just the neighborhood. Stars come in groups called galaxies, and the galaxies themselves come in groups, clusters and superclusters. Distances between clusters are measured in tens of millions and even billions of light years. And there's precious little in between.

Take our local group. There's us, the Magellanic Clouds (our little satellite galaxies that decorate the southern sky), the Andromeda Galaxy just two million light years away, and perhaps 24 others. Our little group seems to be falling toward, and may already be a part of, the Virgo supercluster of galaxies, whose center lies 60 million light years away.

Not only does the space between galaxies tend to be empty, but we are now

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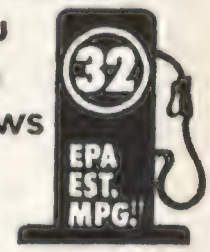

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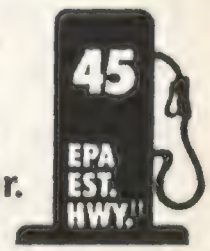

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finding large regions of space that have few or no galaxies. In the March *Scientific American*, an article on galactic clustering reports the work of Robert P. Kirshner of the University of Michigan, Augustus Oemler jr. of Yale, Paul L. Schechter of Kitt Peak and Stephen A. Shectman of Mount Wilson and Las Campañas observatories. In their survey of galaxies near the North Galactic Pole (in the constellation Coma Berenices), they have found a void—an "empty quarter" of the universe—with a volume of 30 septillion cubic light years. (That number translates to a 3 with 25 zeroes after it—or to unimaginably large.)

What I'm saying is that living on a very solid Earth with a bright sun in the day, a moon a trifling three days away, and a night sky full of stars gives us a false impression of the universe. If we look at all those stars long enough, and think about just how far apart they really are, we come to realize that the universe is essentially empty.

This empty space is not exactly a vacuum, as James S. Trefil pointed out in the December 1981 SMITHSONIAN. Energy may be present, and it seems that pairs of particles appear and disappear faster than the eye can follow. But in everyday terms, it is so immensely far from one star to the next, from galaxy to galaxy, and there is so little in between, that the universe is just barely not empty. And if it keeps expanding, as it seems to be doing, things can only get worse.

Thinking about all that space can be dizzying (it's a little like a first cigarette), but the feeling goes away with daylight and the return of human dimensions. No matter how much empty space is out there, things are pretty solid here on terra firma. Except. . .

Except, of course, that everything is made out of atoms and atoms are mostly empty space themselves. Our bodies, our homes, the planet itself are composed of nothing more than little clumps of spinning protons and neutrons wrapped in clouds of even smaller electrons, held together by invisible forces we cannot sense outside the lab.

Atoms are infinitesimal to begin with (100 billion billion to a drop of water), but even if we could see them there is almost nothing to see. In his book *From Atoms to Quarks,* Trefil points out that in an atom with about the heft of an oxygen

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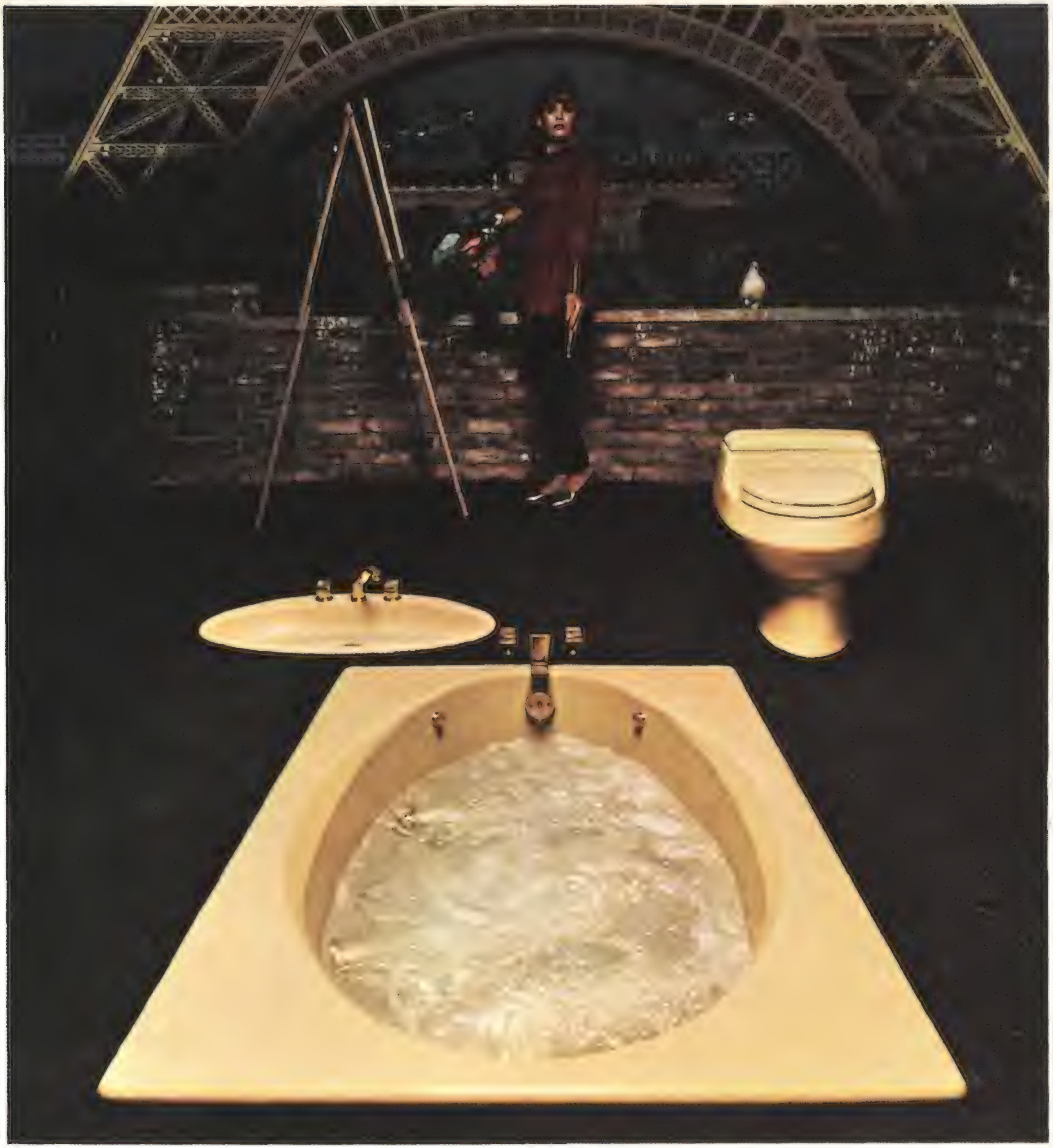

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atom (say ten to 20 protons and neutrons in the nucleus and five to ten electrons in orbit), the nucleus occupies only about one quadrillionth of the atom's volume and the much smaller electrons even less.

Trefil translates that "quadrillionth" this way: if you enlarge the nucleus until it is the size of a bowling ball, then this atom would be 20 miles across with the electrons, now pea-sized, scattered around the sphere. All the rest is empty space. Toward the end of a remarkable film called *Powers of Ten* at the National Air and Space Museum, the viewer flies into an atom, and covers 90 percent of the distance from the outlying electrons to the nucleus before the latter becomes visible. There's nothing like being there to feel the emptiness. That's what we and everything else are made of. It used to bother me to think I was mostly water (somehow the image of a jellyfish would pulse through my mind). Then I was happy to learn that my hormones alone were worth a good $6 million. Now I'm faced with being 999 trillion quadrillionths empty space. Most unsettling.

On fourth thought, though, this is the perfect spot to be in. In fact, it's the only spot to be in. We are just the right size, balanced on a knife-edge between the emptiness of atoms and the emptiness between the stars. A few orders of magnitude up or down the scale, and life would be very empty indeed.

Nowadays we pride ourselves on the Copernican revolution, our reluctant concession that the Earth is not the center of the universe. We live comfortably, if forgetfully, with the knowledge that the Earth revolves around the sun, that the sun is rushing in the general direction of Hercules, that the whole Galaxy is rotating and that our cluster of galaxies is falling toward Virgo. But in the hierarchy of distance scales, we *are* at the center (or at least in the middle), a living dividing line between atoms and stars. I suspect (on no authority whatsoever) that the stars are not the atoms of a still larger universe and that the atoms are not the stars of a still smaller universe. Whether the alternate universes postulated in quantum mechanics have different scales is a question I will leave to a future "Phenomena" columnist. For now, we are the center. And as a scientific sample of one, I'm quite happy that we are.

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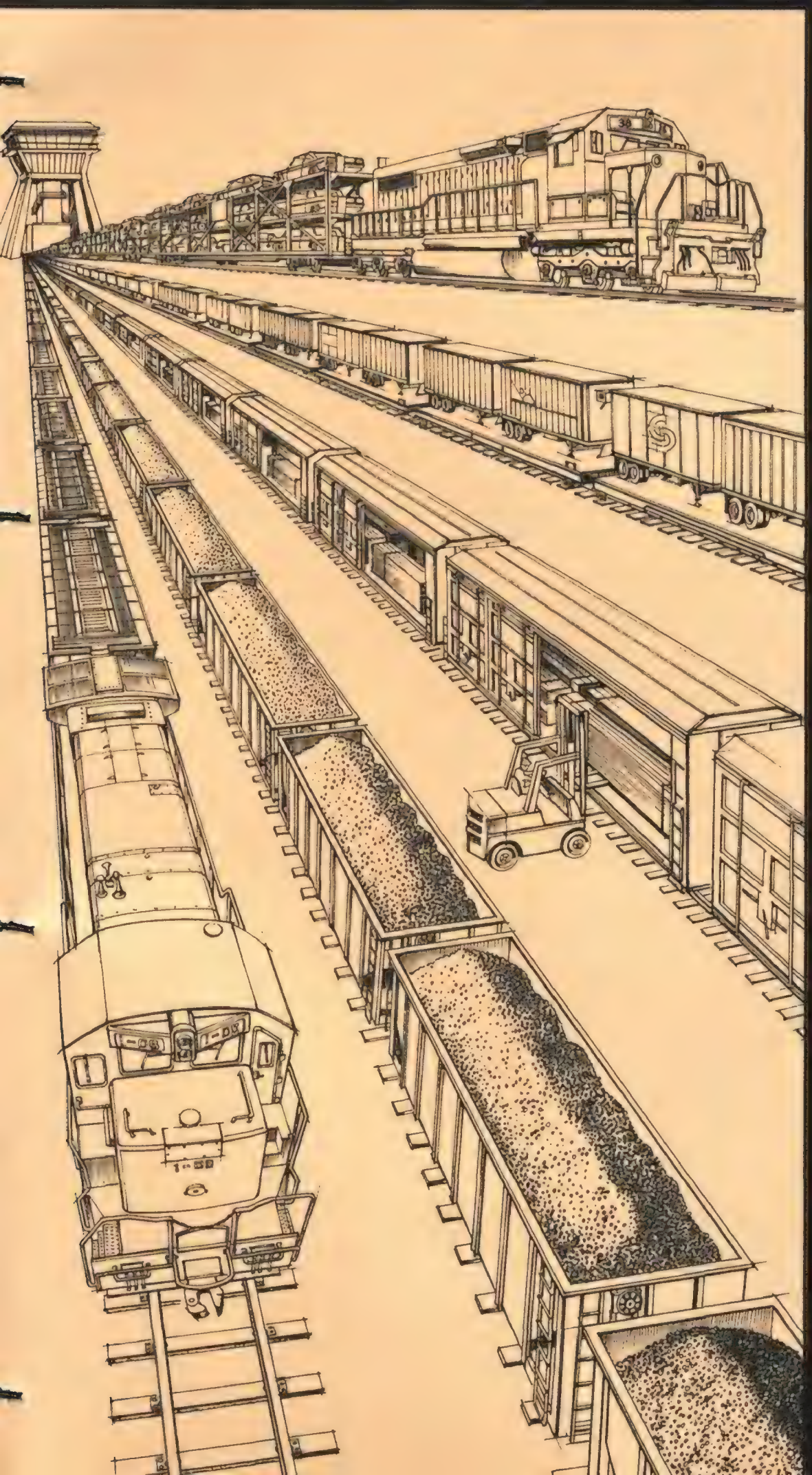

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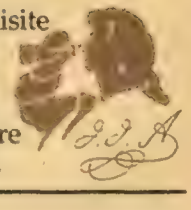

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Around the Mall and beyond

Exactly three years ago, the Smithsonian-University of Arizona Multiple Mirror Telescope was dedicated atop Mt. Hopkins, Arizona. This magazine, of course, took due notice of the event in its May 1979 issue, but only to the extent of describing the golden future of a marvelous piece of astronomical equipment. Finding myself in the neighborhood of Tucson last winter, I wondered if I could watch the MMT in action and experience what is now its routine operation.

I was warned that weather might foil the project, that in winter snow and ice could delay the drive up the mountain, that no matter how pleasant the day in Tucson it would be a frigid night at 8,500 feet or so. It seemed worth the risk, nevertheless. I met my old friend Dan Brocious, public information officer of what is now called the Fred Lawrence Whipple Observatory, and joined a party of young technicians in a spacious and drafty truck for the ride to the MMT.

The road up the mountain has been vastly improved, but the journey is still long and arduous. For an hour, vehicles must lurch over fallen stones, wrench themselves around tight turns and creep past canyon walls that plunge breathtakingly down from the bitter edge of the packed gravel.

Conversation in the truck lurched along with the springs and shock absorbers. Someone had seen a mountain lion. There were fewer squirrels this year. Yep, that means there's a fat bobcat on the mountain. As we rose from switchback to switchback, the temperature sank. We finally reached the observatory area where two smaller telescopes, the 1.5 meter and

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the 61 centimeter, do their work. Observers were assigned to each of them with specific programs to follow, which had been requested by astronomers (who occasionally come themselves). Someone at, say, Harvard can simply indicate what is needed to help him in his project, and the observer does the job and sends the results to Cambridge.

The final stretch of road leading to the summit is the concrete grade—very steep, but electrically heated to melt snow. The truck sailed up it effortlessly though a few inches of snow were banked up alongside. It was very cold on top, and I gratefully squirmed into my parka. Sunset painted the steel walls of the MMT building—a more than 500-ton cube that you can see on the peak from miles away. This is the structure that rotates. At its corners, small snowplows assured that it would turn freely.

As darkness increased, one of the problems facing the MMT became more apparent—the lights of settlements down on the desert. Some 35 miles northward the glow of Tucson lights the sky; to the south, two Nogaleses—Arizona and Mexico—blaze away. Nearer the foot of the mountain are residential developments; farther away, a military base. All these distant twinkles are picked up by the telescope which obviously has a vast light-finding capability. Confusion of course results.

Dan, in conjunction with nearby Kitt Peak and Steward observatories, has taken on the job of trying to educate neighboring communities into cutting down or shielding some of their lights. Both the Nogaleses, as well as Tucson's businessmen, listen to him, and the military base is changing its lighting system.

We entered the building, glad of the warmth of the offices and control rooms that underlie and flank the barnlike MMT chamber. In the chamber it was cold. The instruments are very heat sensitive, Dan explained, and must be kept cool to retain their fine tuning. Already an astronomer and an operator (a woman who had come up in the truck) were carefully winching the delicate photometer out of the innards of the telescope to chill it for the night's work. Liquid nitrogen and then liquid helium were funneled into the instrument, vapor fuming.

The photometer, where the light from the six giant mirrors is gathered, is one of several specially made or adapted instru-

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ments that fit the needs of the MMT. "We make a good deal of what we need right in our own shops," Dan said. "The finely tooled stuff is usually done either at the University of Arizona or the Cambridge Astrophysical Lab." Refinements are constantly being introduced, it seems, since the MMT is one of a kind.

From the third-floor gallery of the building you can step out onto the structure of the scope itself, maneuvering between the mirrors. From the fourth floor you can look down on the mirrors. When not in use, they are covered by a slatted metal cover that rattles out of the way like the lid of an old rolltop desk.

As we looked down, there was a grinding hum, and the whole MMT chamber slowly split apart, segments of wall and ceiling rolling back toward the corners to reveal a broad gap of open air—very cold, for by now dusk had fallen. With another brief rattle the mirror slats rolled away, revealing pools of perfectly polished glass. Obviously the huge device was almost ready to go to work, so Dan led me to the basement to watch the actual rotation of the building.

"You'll find it disorienting," he told me. "A turning building is generally outside human experience." He was quite right. There was a gentle sound, and I suddenly felt that the concrete floor on which I stood was turning like the deck of a carousel. But it wasn't. The building above us was, each of its four wheels following the circular steel track. The wheels, incidentally, have little "cowcatcher" shields to sweep the track clean.

Movement of both the telescope and building comes from electronic nudges that activate small motors. Power for the telescope, in particular, is geared so it always has opposition. That keeps the actual movement smooth as silk. The computer finds the arched path of the star under investigation, then commands the telescope to swing up or down on its yoke.

We saw the result of it all in a control room. The cartoonist's standard depiction of an astronomer, old, bald, perched atop the eyepiece of a gigantic refraction telescope, is badly outdated. This one was in a warm room fed by a jumble of electrical leads. Facing him were a number of television screens. Beside him sat the operator with a pattern of control buttons at hand. One by one, she brought the mirrors into use, each producing a blob of

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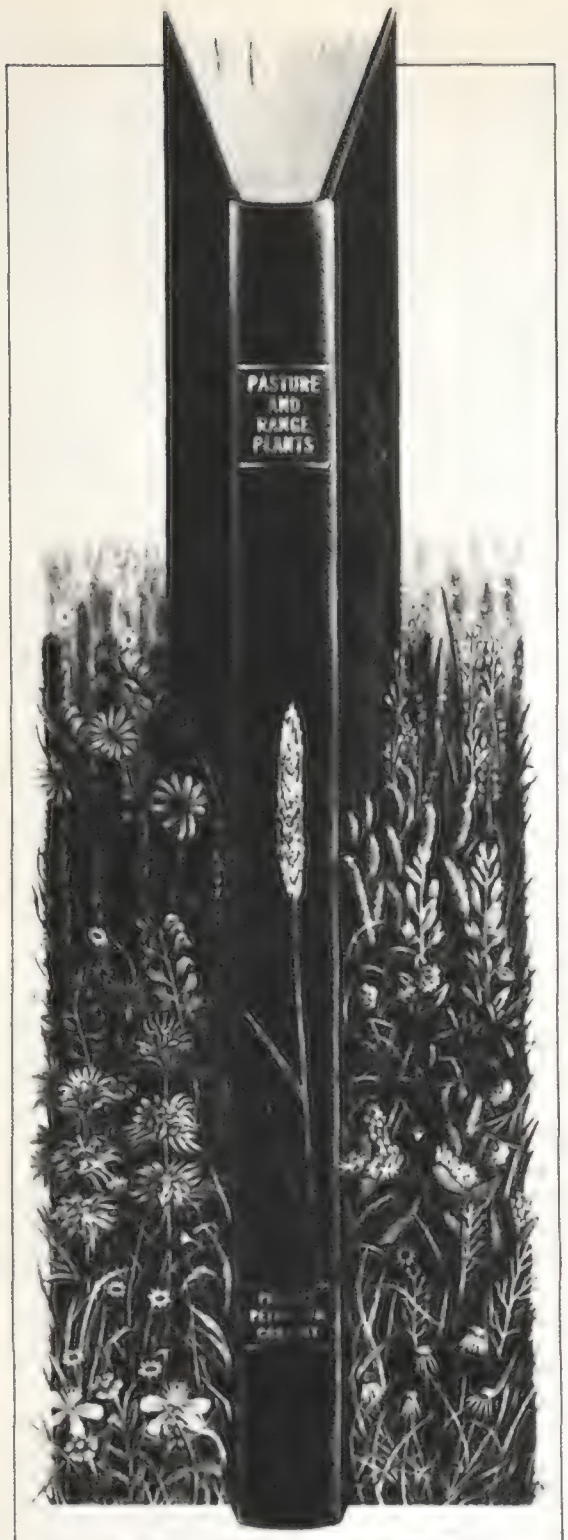

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light on the screen, then being adjusted so that the blobs came together. Thus the mirrors are focused and aligned.

It is an adage that today's astronomers are always tall, pale and bad tempered. I found this one tall and pale, but entirely affable. "Try such-and-such," he would suggest. And the operator would key in a movement of minute proportions. New spots appeared, moved together, blended.

It is a sort of game they play, I realized. A computer game with immense meaning. Not Star Wars. Just Stars.

Spring brings the traditional hordes of visitors to the Mall. Along with high-school students (see "The view from the castle"), foreign leaders arrive. This spring the whole nation has been invaded by the Dutch in celebration of the 200th anniversary of the establishment of diplomatic relations between the Netherlands and the United States. That is our oldest continuously peaceful foreign relationship, and for the Dutch, the oldest diplomatic tie with any major power.

April 19, 1782: John Adams was recognized as Minister Plenipotentiary of the infant United States and three days later paid his respects to Prince Willem V of Orange-Nassau at the stadtholder's residence, Huys ten Bosch. This is now the home of Queen Beatrix and her consort, Prince Claus (below), who were scheduled to visit this country in late April as part of the celebration.

Recognition of the United States was followed by a treaty of trade and friendship and also by much-needed loans to Congress, which knew the young nation had to establish credit in Europe. This financial backing from Amsterdam, the key banking center of Europe, soon amounted to 30 million guilders. Moreover, the Netherlands contributed both financing and engineering aid to the construction of the Connecticut River Canal and the Erie Canal in the early days of the Republic.

The Smithsonian gets into the spirit of this bicentennial with an exhibit of De Stijl art and design at the Hirshhorn. The phrase means "style" and refers to a post-World War I movement emphasizing rectangles in bold colors (SMITHSONIAN, February 1981). The National Gallery of Art is showing Dutch paintings and figure drawings. The paintings come from the Mauritshuis, a princely residence in The Hague which became a museum in 1822 and is famous for its collection of the Dutch masters, many of whom are represented here. For the next two years the "Treasures of the Mauritshuis" will be touring the country, with a stop in Toronto.

The Resident Associates have gone Netherlands-mad, scheduling films, an art seminar, a course on Dutch painting and a tour as well. These are going on this month and into June.

The President of France arrived at the Hirshhorn on the first really splendid day of the young spring. It was a day to stroll on the Mall with your jacket slung over

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your shoulder, and I strolled thus to the Mall entrance of the Hirshhorn and stayed out in the sunlight, perching on a wall overlooking the Sculpture Garden.

Not for long did I perch. A determined policeman kept chivvying people off the wall every time he passed that way, and I wearied of climbing back up every time he'd gone.

Were there perils afoot? I have seldom seen such security for one pleasant-looking Frenchman. His cavalcade consisted of seven motorcycles, a police car, a limousine, a police station wagon, a Secret Service van, three Cadillac limousines, one Buick, one Peugeot and a single police car in the rear. Overhead, a helicopter whumped around in circles. And on a leash quite near me was a monstrous police dog, dragging around a K-9 officer in a black jacket. When a girl cyclist went past wearing a T-shirt with "Stop the Arms Race" on it, the dog barked once, basso profundo. Confident now that the security issue had been solved, I relaxed and returned to contemplating the pleasures of a spring day.

Edwards Park

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By Michael Olmert

The true face of Eskimo life stares out from the primal past

Color photographs by Kjell B. Sandved

Collected a century ago at the Bering Sea, artifacts of a Far North culture will go on display at the Smithsonian next month

In the beginning was the raven. Eons ago, he swooped down out of the heavens and created the rocks and waters, the animals and plants. Out of the pod of the beach pea came the first man, fully grown. When Raven saw First Man walking the desolate Arctic shore, he took pity. Somewhat astonished at the vine's unexpected yield, Raven flew down, landed on the beach, and—using one black wing—nonchalantly pushed his beak over the top of his head.

At that moment Raven too became Manlike—a man wearing a raven mask atop his head. The two thus conversed for some time; Raven teaching, Man learning. Raven told how to eat salmonberries and heathberries, how to fish and hunt. Raven then fashioned for Man a female companion out of clay and water grass. So the pair went forth, the proverbial Adam and Eve of the Bering Sea Eskimo, a people whose idea of Eden was nothing so much as a heavy king-salmon run and a few balmy days in June.

Today, we have come to know that version of the Genesis story through an unusual scientist named Edward W. Nelson (1855-1934), who lived among the Bering Sea Eskimos for some four years, more than a century ago. He compiled and sent back to the Smithsonian a large collection of annotated ethnographic items that vividly document the life story of what is the largest segment of the Eskimo population in existence today. Included are tools and games, hunting implements and clothes to complete the record of a people's technology, life-style, folklore and religion.

The Nelson collection is the largest Eskimo collection in the world—and the finest. Smithsonian anthropologists, under the direction of William W. Fitzhugh and Susan A. Kaplan, have chosen this trove as the subject of a new major exhibition. The result is *Inua: Spirit World of the Bering Sea Eskimo*, a faithful reconstruction of Bering Sea life as it was from 1877 to 1881, before the Gold Rush and the twin contaminants of white culture and economics changed it radically. This exhibit will be at the Smithsonian's National Museum of Natural History from June 18 through January 1983.

The Bering Sea Eskimos are unfamiliar to most of us. These were not the people of the polar regions, who lived in snow houses and hunted whale and polar bear. Instead, Nelson's people were the Eskimos (p. 57) who inhabited the great coastal barrens of western Alaska, concentrated on the deltas of two great rivers, the Yukon and the Kuskokwim. Theirs was a desolate landscape, a treeless place where even today a man can

Ivory plugs with faces (here enlarged about three times) patched skin floats used to hunt seals.

Carved from pieces of driftwood, these are floats from which seal nets dangle in the sea below.

stand on a tiny hillock and stare off into 40 miles of unrelieved marsh grass in all directions. Largely fishermen, they lived in partly underground turf-and-driftwood houses. It was a precarious existence, with a diet that varied from season to season. At times, there were several varieties of salmon running, migrating seals, and berries to be picked. But then there was dead of winter, especially January—a period known in the vernacular as "offal-eating time."

The people thereabouts called themselves Unaligmut, or Malemut, or Kuskokwagmut, or still other names according to their geographical location, and they occupied a coastal strip from three to 100 miles deep. None, however, called himself "Eskimo." We have derived that modern catchall from a North American Indian term of opprobrium that means "eaters of raw flesh." But Nelson's Eskimos seem to have had the last laugh. Their word for the western Alaskan tribe, the Ingalik Indians, was Inkilik, "louse egg," referring to the vermin they were rumored to carry about their persons.

Over the centuries, the Bering Sea Eskimos evolved a rhythm of life and a technology perfectly suited to their harsh existence. The only serious invasion of white culture was represented by the tobacco, alcohol and rifles to be had from Russian fur traders who had set outposts in the region in the 18th century.

It was at one of these old villages, St. Michael, on Norton Sound, that the 22-year-old Nelson was dropped off in June 1877, with the intention of collecting weather data for the Army Signal Service. Nelson got this job through the intervention of Spencer F. Baird, then an Assistant Secretary of the Smithsonian; Baird often arranged such field work for young naturalists of promise, with the expectation that they would collect specimens during their spare hours, catalog them and ship them back to Washington. Quickly, Nelson adopted the Eskimo life-style—clothes, diet and hunting methods. During the next four years, he logged some 4,000 miles by dogsled and

The author, who writes this magazine's "Points of origin" column, reported on the Beltsville Agricultural Research Center in the March issue.

kayak, under harshest imaginable conditions, to add to his natural history and ethnographic collections. Eventually he earned an Eskimo sobriquet—"the man who buys good-for-nothing things"—because of his well-known habit of bartering for even the most modest implements.

An account of Nelson's first extensive trip, in his own words, shows the hazards he endured: "The first of these expeditions was made during December 1878 and January 1879 and covered the territory lying between the mouths of the Yukon and Kuskokwim rivers and extending a considerable distance into the interior. . . . The country . . . was totally unknown. My trip was made in great haste, with the most inadequate means, and with no instruments but a compass.

"On the 4th [of December], at about 6 A.M., long before daybreak, we filed out of the enclosure and were off through the snow fog which filled the air, and marked a temperature in the vicinity of zero and still falling rapidly. With difficulty each sledge followed the one in front, and the leading team had an Eskimo ahead as a guide over the trackless snow. . . .

"December 5th, at 1 A.M., we arose, and after a hasty breakfast of bread, tea, and dried fish, left our camp and proceeded directly to the coast, along which we travelled when the darkness was rendered more intense by the rising wind filling the air with flying snow. This forced us to hug the shore closely, and make our way by following the line of driftwood . . . in the vicinity of the Yukon mouth. . . .

"We found the country between the Kusilvak and Askinuk mountains low, but very hummocky and difficult to traverse. . . . In the evening we crossed four lakes lying at the base of the Askinuk mountains, and arrived at a miserable Eskimo village of two huts called Igragamiut, in the midst of a terrific storm of wind and snow which was so fierce just before we reached the village that my sledge was torn from me, hurled over several times and broken in many places.

A civilization of survival

"We found our quarters in an earth-covered hut, less than four feet high in the center, and sloping on every side. The floor was covered with a deep layer of garbage, giving rise to a horrible stench, while about the low platforms on the sides crouched a number of pasty-faced children and sickly looking elders; a litter of puppies were snuffing about among the wooden dishes in the farther end of the place. A large cake of ice served as window in the roof, and everything bespoke the most abject filth and poverty."

But those were the worst of times for these Eskimos. For the bulk of these people, life—though never easy—was well enough organized to enable them to develop a culture, technology and mythology especially adapted to their less-than-benign environment. And what the artifacts from the Nelson collection show is a highly developed level of craftsmanship and art.

To be sure, Eskimo esthetic values are not perfumed ones. Theirs was a civilization of survival, making do with every scrap offered them by nature. So it is in the art of this exhibit: driftwood, feathers, bones, ivory, skin and sinew are the raw materials. The miracle is how these materials could be manipulated into beautiful and useful things. Moreover, as with most aboriginal art, there is little distance between the resolutely utilitarian and the purely esthetic: if a piece was worthwhile making, it was usually worthwhile decorating and making delightful.

The bola, a weapon for bringing down birds in flight, is a case in point. Ordinarily, this implement was whirled about the head and thrown to entangle waterfowl. But when not being used to hunt it was often worn as a headpiece, its bone or ivory knobs dangling jauntily on the foreheads and temples of hunters. Nearly every implement, no matter how

Naturalist Edward W. Nelson spent four years with Bering Sea Eskimos, gathered thousands of specimens.

Pictograph-decorated pipes (this is a section) were made by Eskimo artisans for trade with outsiders.

Wooden goggles were donned by Eskimos to prevent snow blindness while out hunting.

utilitarian, was decorated and given a spiritual life.

Eskimo snow goggles made of wood (left), with narrow slits for the eyes, allowed one to hunt without fear of snow blindness. But even today their contours and decorations might make them prized as high-fashion sunglasses. There are also intricately carved ivory kayak fittings, amulets and lip decorations called labrets.

But the most oft-repeated themes in Eskimo art are those which reflect the perilous journey through life and these people's most sacred beliefs. The raven, for example, the great *Ur*-father of the race, is present on countless pieces. But he is never depicted outright. Only his footprint—on the bottom of, say, a graceful bentwood bucket for berry gathering—serves as a reminder of his omnipresence. Nelson found a kashim, or men's house, which had been similarly blessed. It showed two raven foot tracks with a red dot in between, signifying that the raven had there eaten fresh meat.

But Raven was not just the father of mankind; he was the progenitor of all the species. Which explained, to the Eskimo mind, why dangerous species such as the polar bear had been created. Their power made Man himself just another figure in the landscape and prevented him from dominating nature and possibly wiping out all the edible plants and animals. A sensible religion, that—one which sanctioned preservation and ecology. This gave rise to another motif in the art, depiction of the pierced hand (p. 58). The doctrine held that whenever Man hunted, some game should slip through his grasp, through the

hole in his hand. These creatures then would continue to multiply, ensuring an eternal food supply.

Again and again in Nelson's writings, the view of a sensible and civilized people appears. Honesty was implicit in Eskimo life. Nelson knew of a man who traveled some hundred miles to pay off a debt of one mink skin. When villages were at war, the sane custom was to avoid the conflict by blacking one's face. A person so marked could travel between the villages, hunting and visiting relatives with impunity.

The Eskimos' epic mythological cycles, recited by village storytellers in the kashims as part of religious and hunting festivals, were accompanied only by simple drumbeats. Once, at St. Michael, Nelson was present when an elderly storyteller was listening to some organ music. Said the old man: "I do not understand what the noise says. It sounds confusedly in my ears and is strange to them, so that I do not know what it says. I like better to hear the drum and singing in the kashim, for I understand it."

Nelson recorded a similar verdict on the Eskimos' contact with Christian missionaries: "So far as could be observed, the sole effect of the priestly efforts has been to cause the Eskimos to become more secretive than formerly about practicing their religious rites when in the vicinity of white men. . . . No one could be found who did not believe implicitly in the power of shamans and in the religious rites handed down by the elders." In fact, when Eskimos saw the Russian Orthodox priests in their robes, they simply thought it a white man's version of their own festivals.

Gradually, the white man's influence began taking its toll. The caribou herds had been so thinned by the introduction of firearms, even by the time of Nelson's visit, that only a handful were being killed each year. During the summer of 1881, Nelson traveled by the U.S. revenue cutter *Corwin* to St. Lawrence Island, far out in the Bering Sea. His object was to study a people dependent for most of their winter food, skins and oil on the walrus. But in 1878 most of the island's inhabitants had perished in an epidemic brought upon them by white traders or whalers. People had died in their tracks delivering relatives to burial grounds. Bodies were stacked like cordwood inside and outside the huts.

Then, too, there was the threat of the sea, which regularly took away unwary fishermen or seal hunters in their frail kayaks or umiaks (large, open skin boats). There was also the constant danger of flooding in the low-lying villages whenever a gale-force storm arose out at sea.

But the sea also giveth. Certainly the Eskimo knew it was his major source of food. And all the wood in his technology was originally the driftwood that started its way to him hundreds, even thousands, of miles away in the Alaskan interior. This gift from the sea was used in kayaks and sleds, hunting spears and net floats (p. 52), tools and houses, toys and games.

So vital a community activity was hunting that it was always associated with a high level of skill and artifice. The Eskimos' method of hunting caribou is a good example. The technique involved two hunters walking as one—bodies touching, in step, Marx Brothers-style—toward a herd. As the caribou watched what seemed to be a single human, the rear hunter dropped into a cleft in the snow. While the first man continued slowly into its midst, the herd circled warily. He passed through, then quickly turned and began to shoot his arrows. When the animals bolted to

Attached to long hunting shafts, a dart (top) and socket pieces (below) speared sea mammals.

Worm-man mask, named for a mythological creature, was worn by a man dancing in the "men's house."

escape the first hunter, they would run directly toward the arrows of the second. This continued, back and forth, several times, before the herd regained its wits enough for the survivors to escape.

A similar bit of animal-like cunning was involved in the so-called "wolf-killer," an eight- or nine-inch piece of whalebone (baleen), sharpened at both ends, bent in a "W" shape and covered with fish skins and fat. When this bait was swallowed whole by a wolf, its digestive juices would decompose the blubber or fish skin, allowing the entire bone to spring open and puncture the wolf's innards. The fatally wounded animal then could be tracked as it fled, and easily dispatched by the hunter.

The Eskimo's skill with the dart or spear was legendary, especially when aided by the throwing stick to gain more leverage, power and distance. According to Nelson, "Bird spears are generally cast overhand, so as to strike from above, but if the birds are shy and dive quickly, the spears are cast with an underhand throw so that they skim along the surface of the water. I have seen a hunter throwing a spear at waterfowl on the surface of a stream when small waves were running; the spear would tip the crests of the waves, sending up little jets of spray, and yet continue its course for 20 or 25 yards. This method is very confusing to the birds, as they are frequently struck by the spear before they seem to be aware of its approach. When throwing spears into flocks of partly fledged ducks or geese that are bunched together, two

or even three are sometimes impaled [all] at once. . . ."

The seal scratcher was another clever hunting device, allowing the hunter, virtually hidden behind a large white glove of polar-bear fur or dogskin, closely to approach a sleeping seal. If the seal awoke and seemed apprehensive, the hunter reached for a wooden scratcher with seal claws at one end. He used this to scratch the surface of the ice, making sounds like a seal digging a hole, thus putting his quarry at ease. Significantly, the best example of a seal scratcher in the Nelson collection includes a tiny blue bead on the seal paw—representing the pierced hand with its attendant respect for nature.

Every bit of creation had its inua

The single most important concept in Bering Sea art and religion is that of *inua.* Every bit of creation —plants, animals, rocks, men—had its particular spirit, its *inua,* which would live on after death. A hair-seal mask used at festival time depicts both the animal itself and—within a circle on its back—its *inua,* wearing snow goggles. Occasionally, the Eskimo believed, the seal *inua* would reveal itself to the hunters.

In one of the greatest of Eskimo religious festivals, the bladders of all the seals, walruses and belugas killed that season were chanted over and then given back to the sea. The bladders represented the seals' *inuas,* which could then return to unborn seals. The hope was that if the *inuas* were treated with care and respect, they would let themselves be caught by "good" hunters in the future.

The *inua* idea is rife in Eskimo art, especially on masks and hunting equipment. One finds a black bear, whose *inua* is concealed under a patch of human hair (see cover), or a man-doll with tiny doors that open to reveal the *inua* inside.

Occasionally, the spirits of dangerous animals had to be exorcised. Nelson himself witnessed the ridding of a fox *inua* lest it cause mischief in one village: "A hunter entered the kashim bringing a red fox which he had just taken from the trap; after skinning it the pelt was stretched and placed in his storehouse. Then he returned to the kashim and taking the carcass, carefully cut the tendons of the fore and hind legs and a hole at the navel. Carrying the carcass outside he took it off the roof and, opening the smoke hole, held the body over it. The men sitting in the kashim at once united in shouting, 'An-ok! (He goes!) An-ok!' at the top of their voices. The carcass was then placed on the top of the hunter's storehouse, so that no dogs could reach it. The people told me that by this ceremony the shade of the fox was dismissed either to the land of the dead or back to the tundra, where it would be harmless."

This Eskimo couple from the Kuskokwim area, photographed by Nelson, appeared in his 1899 report.

Dolls from Big Lake village; she is in European dress while he is wearing native caribou skin.

Today, in the Nelson collection, the body of such beliefs is everywhere visible. Arrow-shaft straighteners are made in the shape of the hunter's prey, caribou; and clever arrowhead sheaths are fashioned like the game they soon would, it was hoped, impale. Here a quiver support carved with the image of a mythological beast, to lend its excellent hunting *inua* to Man; there, a seal dart of ivory that was carved in the shape of a wolf.

There are similarities between our cultures, perhaps most apparent in the Eskimo folktale that explains how mankind discovered tears: "One day Man went out seal hunting along the [shore]. He saw many seals, but in each case after he had crept carefully up they would tumble into the water before he could get to them, until only one was left on the rocks; Man crept up to it more carefully than before, but it also escaped. Then he stood up and his breast seemed full of a strange feeling, and the water began to run in drops from his eyes and down his face. He put up his hand and caught some of the drops to look at them and found that they were really water; then, without any wish on his part, loud cries began to break from him and the tears ran down his face as he went home. . . . After he told . . . the story of his disappointment, [his family was] stricken with the same strange ailment and began to wail with him, and in this way people first learned how to cry." The brotherhood of Man, and the necessity everywhere of coping with frustration and despair, is clear.

As for Nelson, he went on to a prodigious career as a naturalist in the American West and in Mexico until he retired as chief of the U.S. Bureau of Biological Survey in 1927. His four years as a young man in Alaska left him with a weak constitution and he only once made a return visit to the North. In Arizona, where he recovered from tuberculosis, he and his brother ran a cattle ranch. Nelson published his monograph on Eskimo ethnography in 1899 in the *18th Annual Report of the Smithsonian's Bureau of American Ethnology* (it has just been reprinted by the Smithsonian Institution Press), 518 pages of text, including 107 plates of specimens and detailed drawings of 165 others, plus some of his own photographs of the people and villages.

He never married, preferring to devote his life to his work on behalf of North American wildlife. In fact, at the time of his death in 1934, Nelson was seen as a kind of father to the U.S. Fish and Wildlife Service, a man for whom more than 100 species of plants, animals, fish, butterflies and birds are named.

The world has produced countless intrepid explorers who went out to map untouched and dangerous climes. Nelson was just such a man, except that his real territory was the mind of Man himself, for he charted a new people now greatly altered from their former condition. Western technology is fast encroaching on their traditional life-style, folklore and art. Like so many others before them, their material culture—and the spirituality that is its essence—also would have been lost to the mists of time, but for the bell jar laboriously erected by E. W. Nelson.

Eskimo mask shows *inua* of mythological bird with pierced hands, and walrus in its mouth (bottom).

A shaman's mask, probably worn for ceremonies, was collected on St. Lawrence Island in 1881.

Alyson Mord, actress and ninth grader, sprawls in one of the school's halls to apply her eye makeup.

If she cannot take daytime classes, she "goes on correspondence," for her schoolwork *must* be done.

By Leon Harris

Photographs by Ethan Hoffman

Late for class? O.K., if the excuse is show business

At this New York school, talented youths who can't always attend from nine to three get a solid dose of the three Rs, anyway

Lugging her cello, Jennifer Combs, 16, heads for music class at Juilliard, a few blocks away.

On any day at New York's Professional Children's School, 132 West 60th Street, almost half of its 260 students, ages nine to 18, are likely to be missing. Such absence is not unusual at PCS. Indeed, it is the school's raison d' être.

One sunny Tuesday, for example, a reporter found that more than a dozen students were on Broadway, appearing in current hits or rehearsing for shows soon to open (*Evita, Camelot, The Little Prince*). Several dozen more were in Hollywood or on location making movies (*Pennies from Heaven, Taps*) and TV shows (*Harper Valley P.T.A., Search for Tomorrow, Fame, One Day at a Time*) or at "go-sees" at various modeling agencies around town. Others were on Long Island or in the Caribbean or elsewhere making TV commercials (Kool Aid, Cheerios, Tab, Kellogg's Corn Flakes). Others were all across America or abroad in touring companies.

These absences are in the long tradition of PCS, a private, coeducational school founded by Mrs. Franklin Greer Robinson, daughter of an Episcopal bishop of New York. She had been horrified when she went backstage at the 1914 Broadway hit *Daddy Long Legs* and found a group of child actors engaged in a fierce, profane and professional poker game, although they had only the sketchiest acquaintance

with reading and writing. In the two-thirds of a century since then, PCS has educated an important number of professional youngsters, including many whose names became household words—Milton Berle, Ruby Keeler, Donald O'Connor, Joan Blondell, Dick Van Patten and Gene Raymond. Even a very abbreviated list of former PCS students who today have very important professional careers is impressive: dancers Merrill Ashley, Fernando Bujones and Suzanne Farrell; actors Elliott Gould, Carol Kane and Eddie Bracken; choreographer Eliot Feld; director Sidney Lumet; Oscar-winning composer Marvin Hamlisch; singers Leslie Uggams and Beverly Sills; and musicians Lorin Hollander, Pinchas Zukerman and Buddy Rich.

A few of them look back on their days at PCS as an unpleasant part of growing up. The New York City Ballet's Heather Watts once told a reporter, "I absolutely hated going to Professional Children's School. I thought it was horrible." But most graduates credit the school with making their careers possible, although no professional training is given there—only the usual scholastic subjects—languages, sciences, math, English, history and so on.

PCS is run entirely for the convenience of its students. Its shocking credo is that God did not insist on Mt. Sinai that arithmetic and biology must *always* be taught between 9 A.M. and 3 P.M. Here, the typical PCS student is a professional, occasionally the sole support of a family, and must therefore take work whenever and wherever it is.

Even when they are not working, most of these children must be away from the school for at least

Author of Merchant Princes, *Leon Harris is a Texas writer. He explained the workings of* Who's Who *in last November's* SMITHSONIAN.

When PCS children audition for spring production, drama comes on strong. These sixth-grade students are

Teacher Vincent Morrissette grades English paper of seventh-grader Yoon Seok Choe, a violinist.

trying out for parts in *Snow White and the Ten Dwarfs*—their own version of the fairy tale.

Senior Theara Ward faces a laboratory test. She's a member of the Dance Theatre of Harlem.

part of the "normal" school day. About 38 percent take daily ballet classes, most at the School of American Ballet (SAB), and 12 percent take music classes at Juilliard. About 31 percent are actors. The other professionals include ice skaters, horseback riders, models, even, briefly, a professional disco roller skater.

When these children are on tour or performing in New York or have professional classes that preclude their attending PCS, they "go on correspondence," either partially or entirely. Their daily classes and their examinations are sent to them by mail. "You are permitted to miss school physically for a professional reason," explains Betsey Purinton, the director of admissions, "but you are not allowed to miss the schoolwork for *any* reason."

A reporter visiting the school would find nothing preppie about it. The incidence of tweed jackets and ties or kilted skirts and Fair Isle sweaters is minimal. Many students walk with the ballet dancer's splay-footed stance.

Bulletin board with casting calls

Next to the elevator on the first floor are two pay telephones and a bulletin board on which are posted casting calls as well as telephone messages for individual students from agents, stage managers or casting directors. If necessary, students are even called from class to the telephone. But mothers learn quickly that a change of time for an orthodontist's appointment is *not* considered urgent at PCS. Even before enrollment, youngsters and parents learn from the "Application for Admission" that this differs from other schools. The applicant must list "Union Affiliation" and "Name of agent, manager, or agency." He or she must also "Describe performing or professional experience (recitals, commercials, films, shows, television, and list dates)."

"We have to protect the school," insists four-foot-ten-inch, 88-pound, 32-year-old Betsey Purinton, who looks younger than many of her students, "from mothers who honestly believe 'my child is just so creative' but whose child is in fact merely unhappy and undirected. We only have some 60 places in our middle school—fourth to eighth grade—and 200 in our high school, so we make every effort to allot these to students who can benefit most from them." Almost 40 percent of the students cannot afford the $3,250 to $3,900 tuition and so receive at least partial scholarship aid. Ethnic and national backgrounds vary widely. There are currently 21 blacks, 13 Hispanics, 12 Koreans, four Russians, three Japanese, with a sprinkling of Venezuelans, Israelis, Chinese and Canadians. "Every year about ten percent of our new students speak either not one word of English or very

Shannon Stevens rehearses at School of American Ballet. Her brother and sister also go to PCS.

few words. We fit them right in by means of our intensive courses," Miss Purinton points out.

Outsiders frequently confuse PCS with New York's School of Performing Arts, which has its own list of distinguished alumni: Al Pacino, Richard Benjamin, Liza Minnelli, Suzanne Pleshette, Eartha Kitt, Arthur Mitchell and Edward Villella. Performing Arts is a public high school for talented young people who study their art right there along with their general subjects. PCS teaches only academic courses. The film *Fame* is about PA, but starred a number of professional children and alumni from PCS, including Antonia Franceschi in the role of the talented young dancer who commutes between her family's luxurious apartment and the rough-and-tumble atmosphere that is PA.

Some 18 months ago, when she was 18, dancer Franceschi was working on Broadway in *Makarova & Company* when, because of an injury, prima ballerina Natalia Makarova decided on Friday not to dance the *Bach Sonata* at the Saturday matinee. After feverish rehearsals that continued right up to curtain time, Miss Franceschi danced it with British ballet star Anthony Dowell, and received ten curtain calls. Miss Franceschi's schoolmates fully expect the same miracle in their own lives.

Success means no social life

Although all PCS students are, at least to some degree, stars, frequently and inevitably one individual in each field seems to professors and peers alike primus inter pares. One such is Chun Leung To. Born in 1964 in China, Chun is an only child. His father, a violin teacher, and his mother, a piano teacher, began giving him lessons on both instruments when he was four. When the three of them fled to Hong Kong in 1979, Chun supported all of them when he became the youngest member of the Hong Kong Philharmonic. A visiting American violinist, bowled over by the 15-year-old prodigy, made a tape recording of Chun's playing. This led to Juilliard's precollege division and PCS (his parents are still in Hong Kong), where he helped support himself by working as first violinist in the Brooklyn Philharmonic until he received full scholarships at both schools.

Now six feet tall, dressed in Lee denim coveralls and blue-and-yellow jogging shoes, Chun might pass for an American teen-ager, until he is asked about his social life. "I have no social life. Until I graduate in June, I have at least six hours a day of classes and homework at PCS," he explains. "In addition I have four hours of violin study or practice daily, two hours of piano practice, as well as rehearsals of the New Orient Quartet that I've formed. We hope to enter

the important competitions—Tchaikovsky [Moscow], Queen Elizabeth [Brussels], and Paganini [Italy]. If I had a social life I would not win competitions. In Japan, in Korea, in Taiwan, there are other talented young violinists that I don't even know. I must stay ahead of them—if I *am* ahead—and get ahead of them if I am not."

This consuming concern with competitors is especially apparent among older students. Jennifer Combs, a 16-year-old cellist (p. 61), whispers, "There are *so* many good cellists, everywhere, they're coming out of the woodwork." Jennifer competes with fellow students for jobs at weddings and dinner parties that provide the money most of them need and the experience with a live audience that they need even more. "Sometimes I make $25 or $30 between three and six in the afternoon playing on Fifth Avenue, but I'm afraid to work on the street at night. It's too hard to run with a cello."

No treacly tykes here

Much younger than Chun Leung To or Jennifer Combs and, so far, much more relaxed about her competitors is 12-year-old veteran Marisa Morell. For years she has been a dues-paying member of Screen Actors Guild, American Federation of Television and Radio Artists and Equity. She has flown with Sandy Duncan in *Peter Pan,* played Jane Alexander's daughter in *Kramer vs. Kramer,* toured for a year as the star of *Annie* and made TV commercials for Kraft Cheese, Polaroid and Wonder Bread. Asked if she is distressed when she loses a part to a competitor at an audition, she laughs. "I don't worry. If I lose one, I'll get another. And I can't do them *all*!"

There is about Marisa absolutely nothing of the treacly, Shirley Temple, goody-two-shoes "tyke" or "moppet," nor of the temperamental, tantrum-prone prima donna. She is a bright, blond, pigtailed, friendly straight-A student. Just as surprising at PCS is the absence of the mythic "stage mothers" who so affected the childhoods of Judy Garland, Milton Berle, Gypsy Rose Lee and her sister, June Havoc. "That kind of stage mother seems to have gone out of fashion," suggests Carol M. Lane, PCS's soft-spoken director.

Not one of all the children interviewed even mentioned the hard work that is their daily fare. Perhaps none knows or remembers anything else. "I decided to be an actor at my brother's Bar Mitzvah when I was three," admits Willi Morrison (right). "We put on a show and I sang *Raindrops.* I loved the applause so much that I kept singing it again and again—they had to carry me off, kicking and screaming." By the time of his own Bar Mitzvah, Willi had so many professional credits (*Most Happy Fella, Babes In Arms, The Music Man, Mame, Peter Pan, Oliver*) that his proud parents printed his Bar Mitzvah announcement in the form of the "Playbill."

Ninth-grader Willi Morrison, right, runs through a scene in off-Broadway's *Sleeparound Town.*

Willi and another PCS student, Jonathan Ward (p. 69), recently had the exhilarating experience of being murdered every night. They were in Sarah Caldwell's production of *Macbeth.* "It was great fun," said 12-year-old Jonathan, "but sometimes the blood smells and it's hard to get out of your hair." Along with his older sister, Liz, an eighth-grader at PCS, he is presently involved in making a TV film, *Maid in America.* The Wards are among several families at PCS. The Stevens family, from Hope, Arkansas, boasts three ballet dancers: Shawn, 18, Shannon, 17 (opposite) and Gordon, 15. The three of them share an apartment within walking distance of the school. Other students whose parents are not New Yorkers often live with "parent sponsors" and their families.

Jonathan does not look like an "artist." Most PCS

Greeting her mother, Lady Jean Campbell, is Cusi Cram, 14, already an actress and model.

students don't. In fact, a surprising number look like nostalgic notions of Tom Sawyer and Becky Thatcher, which is why they are constantly in demand for lucrative commercials. Jonathan's blue eyes, blond bangs, and freckles give him an All-American Boy look that doubtless explains his TV roles for Pringle potato chips and Aim toothpaste. He says he is not downhearted if he is not chosen at an audition. "But if *I* don't get it, I hope one of my friends here at school gets it."

Such generosity of spirit is not universal at PCS. When tiny, then-10-year-old Aramis Estevez stabbed his classmate Christian Slater in the arm with a pencil during English class, he was sent to middle-school principal Susan Blum for a scolding. The reasons Aramis gave for the fracas and his version of who did what to whom first differed markedly, of course, from Christian's story. But what neither of them mentioned was what may have been the precipitating factor—that they are professional competitors for commercials who appeared together once in the CBS soap *Search For Tomorrow*.

Not all the roles offered to PCS students are freckle-faced and squeaky clean. Hazel-eyed, handsome, five-foot-six-inch, 125-pound Eric Brown, whose complexion is not yet free of the usual teen-age acne, recently starred in an R-rated film, *Private Lives*. "I play a 15-year-old, innocent rich kid who's seduced by his 28-year-old governess. . . . It was quite a change for a kid trained by Franciscans and nuns," he smiles, "and my old pals think I'm the luckiest kid on the block."

Serious concerns with money and future careers are apparent in PCS children of tender years. Jenn Thompson, in a voice that sounds even lower than Tallulah Bankhead's, explained recently the details of her seven-year contract with NBC (she is Dee, Barbara Eden's daughter, in the *Harper Valley* series). When she went on to tell how much she paid her guardian, it became difficult to remember she is only 14. "I always get all As and Bs when I'm here in New York, but my grades usually fell to Bs and Cs when I was shooting *Little Darlings* in Madison, Georgia. But I never fall below a B average because you have to have a B average to work in California." Asked her Social Security number, Jenn immediately reels it off.

"At PCS you're forced to face problems earlier," recalls a former student, Michael Reed. "Relationships with the opposite sex, dealing with New York City, something as simple as learning to keep your mouth shut. The only room I could afford was in Queens, where if you say you're a dancer you've got to prove you're not homosexual. And you don't talk on the subway. I used the 45 minutes each way on the F train to do homework. When you first get here, you're used to being a star wherever you came from, and it's tough enough getting used to the fact that you're no star here without making extra problems for yourself with outsiders by talking too much."

Students here crave applause

Special children need special teachers, and one of the best at PCS is red-bearded, bespectacled, articulate Vincent Morrissette (p. 62). A Fulbright scholar who has taught in other private as well as public schools, Morrissette admits: "This school has spoiled me. I could never enjoy teaching anywhere else half as much. The students here are more interesting, more challenging. They crave applause, encouragement, and have a very low frustration tolerance. They require individual, personalized attention—a hug, a pat on the head, a personal physical acknowledgment. Many are far from their families and need warmth.

"If you give them constant reinforcement and are genuinely interested in them, not just in how well they're doing in your subject, they'll work as hard at their academic subjects as they do in their art. Unlike regular students, they don't need to repeat a lot of deadly drill, because they pay attention and respond. They're used to correction in their professional lives and used to directors or choreographers who want fast results. I go to their performances and discuss their health, their living conditions, their artistic trials, and they bloom."

Some PCS children share the limelight with parents who themselves are artists or celebrities and frequently away performing. Cusi Cram, 14 (above and opposite), is a $1,000-per-day model and a regular on ABC's

Cusi (it's an Inca word for "happy") works out in Olympic Towers gym with trainer Samuel Bariman.

Debbie Wingert, 16, does homework under eye of Alexander Kramarevsky, whose family she lives with.

soaper *One Life to Live*. She also is the daughter of the colorful Lady Jean Campbell who, like her former husband, Norman Mailer, turns up in the media.

"The most terrible problem for a child here," says Morrissette, "is when it becomes clear that as an artist he or she has no chance for success. Failure for these children seems as unimaginable as death. It's something that only happens to someone else. This means, of course, that the child refuses to see artistic failure coming and so does not gradually accept it. Only when the ax falls is the shattering truth finally faced. When this happens, the child must somehow be convinced that life is not over or meaningless. It's hard. A dancer, for example, may quickly put on a lot of weight and cut off her long hair, symbolic that her life is over. We must somehow make some alternative acceptable.

"When one of our girls finally faced her failure and decided to study neurosurgery at the university, we were all relieved and proud. Another girl, who was dropped by SAB, became a successful model."

For such "failures" it becomes apparent that their academic work has not been a necessary evil. As director Carol Lane and her staff stress constantly, "You have to educate more than your feet! We stress the need to keep options open so that choices *can* be made. And in every field there are famous examples of great artists whose personal lives were tragedies because they not only failed to educate themselves broadly, but also failed to learn how to get along with other humans."

Half the graduates go on to college

The academic achievement of PCS students is impressive. As in the case at most good private schools, PCS graduates (half of whom go on to college) do substantially better than average on college-entrance examinations. Last year's graduates were accepted at Barnard, Haverford, USC, Sarah Lawrence, Smith, the University of Pennsylvania, as well as at prestigious specialized colleges including the Boston Conservatory, Eastman, Parsons School of Design and Juilliard.

But there are problems. "We still have 75 percent girls and only 25 percent boys," complains Betsey Purinton. "Even today, fewer families are willing to commit their sons to the arts at an early age than are willing to commit a daughter. And our turnover at 20 percent is still higher than we would like it to be. The four most common reasons are families moving away from New York, children moving out of their professions, children not asked back because of grades and parents who simply cannot afford our fees."

With so much individual attention for so many children, costs are high. Despite scholarship funds from sources such as *Reader's Digest*, foundations and

individuals, there is never enough to take care of all the talented children who need it.

Nor can PCS, any more than any other school, perfectly protect its students from all injustices. Beautiful, black ballerina Theara Ward (p. 63), a PCS senior, has toured for three years with the Dance Theatre of Harlem, in the United States, Australia, England, Ireland, Israel and Italy. About to leave for a tour of Japan, Theara recalls earlier years at PCS. "I've felt lots of prejudices here, not only because I was black but because I was not part of the School of American Ballet clique. They think if you're not SAB, you're not a real dancer."

PCS is an urban school, and one cannot help wondering about drugs. Miss Ward stares for a moment at her violet-painted fingernails. "Nobody does dope here at PCS. None of us can afford it if we're serious about a career, so there's none of the peer pressure to do it that you find at nonprofessional schools."

Some PCS children are so specialized that they do not get work frequently—for example, the four ice skaters, who nevertheless get up when it is still dark every morning in order to be at the New York Skating Club by 6 A.M. Remembering that world-champion skater Carol Heiss went to PCS helps them put up with chronically sore, tired muscles.

Other children do not work at all, because they are not chosen at auditions or because they are, at least for the moment, has-beens, or because they are only at PCS because a brother or sister is there and their parents want them brought up in the same arts-oriented atmosphere. Many PCS graduates finally choose careers outside the arts. These range from college president to psychiatrist to mortician.

The reporter came to PCS believing that its students would be abnormal and the school esoteric. He left convinced of how very like "normal" students they are and how much "normal" schools can learn from PCS. The PCS teacher's genuine interest in and respect for the student's special interest usually evokes a reciprocal respect and interest. PCS teachers have learned that the same intense competitiveness, the same terrible yearning for applause that makes a singing or soccer star, can also be channeled into academic studies. Conversely, the need for more education in the arts in ordinary schools all across America was expressed recently by a trustee of PCS, the distinguished actress Celeste Holm. "An educated mind without an educated heart is no education at all. I think the arts are for educating the heart."

Jonathan Ward makes a call home to learn of possible auditions. His sister, Liz, awaits the word.

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By Norman Myers

A leopard's ways prove adaptable to modern haunts

More versatile than the lion, and more patient than the cheetah, these great predators are surviving Man's expansion

Among my most vivid experiences during 23 years in Africa was a day I spent at Serengeti National Park in northern Tanzania, in the company of a leopard. While a leopard lacks the majestic stature of an elephant, the sheer strength of a lion and the elegant grace of a giraffe, it reveals a nature that sets my senses tingling just to think of it. No other animal of the African scene appears so much its own creature. The leopard is a supreme example of Kipling's cat that "walked by himself . . . by his wild lone."

I came across the leopard at daybreak, sunning itself on the branch of a spreading acacia tree and gazing intently at a herd of Thomson's gazelles out on the savanna. The gazelles were slowly approaching a stream—not that they needed to drink, as they do not bother much with water; they were seeking out the greener vegetation along the streamsides at that late stage of the dry season.

The leopard scanned the reed patches along the stream banks, possibly sensing that they would offer plenty of ambush cover. But it did not rush off for a botched-up attempt at attack, in the way that lions sometimes do. As it waited and watched, it appeared to weigh the odds about the direction in which the gazelles' grazing activity would take them.

In Tanzania's Serengeti Park, leopard waits in grass; its hunting strategy relies on patience, surprise.

After much careful scrutiny, lasting at least an hour, the leopard slipped down the trunk of the tree on the side away from the gazelle herd. Immediately it impressed me as a consummate hunter—exceptionally efficient, indifferent to all else. Creeping along the ground with sinuous stealth, it arrived at the foot of another tree nearer to the stream. Selecting the side of the bole that would conceal it from the gazelles, it took a single, agile leap to a fork a good ten feet above the ground. Again it checked out the gazelle situation. By this time I had driven my safari truck to a vantage point a little way ahead of the leopard's path; descending to the ground once more, the leopard made use of my safari truck as stalking cover, peering around the fender at the gazelles without the least regard for me.

Finally the leopard snaked its way through the last stretch of grassland, a hundred yards of foot-high grass. Even though I was watching it through my binoculars, I all but lost sight of the animal as it weaved its way through the sparse grass.

When the leopard reached the thicker growth of the streamside, it disappeared altogether. I settled down to wait. The gazelles moved closer, until eventually they entered the tall tangles of grasses, reeds and sedge. This, the gazelles recognized, was a potential danger zone, and they became unusually alert. But they still nosed their way in at the edges of the lush vegetation, seeking out the juiciest material. Five minutes passed and nothing happened, then ten. The savanna scene was as serene as ever.

A solitary, secretive hunter

Half an hour later, still nothing had happened. While waiting, I pondered on the ecological slot occupied by that leopard in the Serengeti. Its spotted coat made it hard to discern in the savanna. It matched the clumps of vegetation that dotted the grasslands, and it would make equally fine disguise in a forest, where the dappled-light patterns would conceal the leopard at a few yards. This camouflage, together with its technique of instant attack at ultra-close quarters, allows the leopard to be equally at home in the forest or the open grasslands.

This makes a leopard a more versatile hunter than a lion, which cannot operate among the thicker vegetation of a jungle (except in Tarzan movies), or twist like a leopard in a confined space, or deploy its strength so well. Moreover, a lion does not like to hunt alone, whereas a leopard invariably goes on the prowl unaccompanied. Of all the great predators of Africa, none is so solitary and secretive as a leopard. Its hunting strategy reflects its nature: it works by surprise, approaching its prey as close as it can, then a step or two closer.

Out on a limb, leopard prepares to eat a Thomson's gazelle it has just killed and lifted into a tree.

Leopard strides across the grassland; sunlight falls on its dark spots, usually arranged in rosettes.

As I sat and waited in my safari truck, I visualized the leopard among those streamside tangles, steadily edging its way toward the unsuspecting gazelles. No lion or cheetah, I thought, would have demonstrated a fraction of such patience before launching itself into its attack. Another half hour passed. Then suddenly a spurt of dust flew up as the gazelles scattered in headlong flight. When the dust settled, I discerned the leopard sitting at the fringe of the taller vegetation; dangling from its jaws was a kicking, full-grown gazelle in its last throes. Despite the thrashing around of its prey, the leopard stayed seated, moving not a muscle, impassive and implacable.

As soon as the struggles had died away, the leopard set off with the carcass toward a nearby tree. It plainly wanted to get its prey out of the reach of other carnivores, such as lions, who might want to rob it. Dragging a weight that was at least half its own proved no easy task for the leopard, and it had to pause a couple of times before it reached the tree. I wondered how it could possibly haul its booty aloft. But the leopard did not hesitate, except to take a firmer grasp of the carcass between its teeth. It gathered its haunches beneath itself, like a coiled spring, then lunged for the lowest branch, about the height of a tall man.

I expected the leopard to start eating. Instead it merely rested for a few minutes, before starting to drag the carcass still higher up the tree. Not until it reached a vantage point some 25 feet above the ground was it finally satisfied.

I mused on this display of strength. I had heard from fellow scientists that a leopard has been known to pull down a 300-pound antelope and somehow manage to get it into the cover of a thicket. Even a giraffe calf has been found high up in a tree fork; what other creature could carry it up there except a leopard? Pound for pound, the leopard is far and away the most powerful of Africa's predators.

After a further rest, the leopard began to feed. It opened up the gazelle's abdomen, allowing the guts to spill out onto the ground. Then it worked its way through an entire hind leg, spitting out tufts of hair. For a couple of hours the leopard tore away at the carcass. Eventually it seemed satisfied, and it moved away to a different part of the tree, where it draped itself over a branch with a degree of relaxation that I have never seen matched in any other creature.

I returned to the site a couple of days later. By this

The author is a conservation scientist working in Nairobi, Kenya. His latest book, The Sinking Ark, *is about the problem of disappearing wild species.*

Its patterned coat provides camouflage in forested regions, where it moves unseen in dappled light.

A captured hyrax is common meal for a leopard, whose varied prey range from small rodents to antelope.

time the gazelle carcass had turned green under the African sun, and there were more flies than flesh. But the leopard was still nibbling away.

Since that encounter, in 1968, I have rarely seen a leopard again. Although I have traveled through more than 40 countries of sub-Saharan Africa on repeated trips, and once tracked a single male leopard in the Serengeti for more than two weeks, I have never done more than catch occasional glimpses. Leopards are not only secretive and solitary, they are generally nocturnal and shy. From my home on the outskirts of Nairobi, I frequently go jogging in Karura Forest, a ten-square-mile tract on the edge of a metropolis of more than a million people. As I run along the forest trails, I have encountered leopard droppings and pugmarks, though not even a glimpse of an actual leopard.

A cat unto itself, the leopard nevertheless has made more of an impression on me than any of the other wild creatures of Africa. Whenever I have come across a leopard in the bush—mostly at night, when the headlights of my safari truck catch a spotted tail slinking into the grass and I stop to watch a pair of yellow-green eyes eyeing me back—I have felt I was closer to Africa's wild world than when in the company of a lion or a crocodile. From somewhere behind those green eyes it has told me that it was a being apart, with nothing in its nature that communicates with the human intruder in its wild realm. The experience has invariably left me tingling with excitement and with a strange sense of unease.

Like many other people, I supposed—on the basis of my own chance encounters—that the leopard is primarily a nocturnal creature. After all, the hours of darkness surely suit a creature that is so furtive and full of guile. However, the leopard is not invariably an animal of the night. In Serengeti Park in northern Tanzania, in Mara and Samburu Reserves in Kenya, and in a few other protected areas of Africa, leopards are frequently found by day. Moreover, a leopard basking in broad sunlight does not disappear at the first sight or sound of the human visitor. On the contrary, it remains relaxed, enjoying its lookout perch on a low tree branch or a rock, even when half a dozen safari trucks arrive with perhaps a hundred tourists, their chattering matched only by the clicking of their cameras. Safari professionals in Kenya, Tanzania, Uganda, Botswana and Mozambique have told me that in the 1950s, when there was little pressure on wild lands from human communities, and when the spotted-fur trade had hardly been thought of, there were many areas where leopards could be readily encountered by day.

This all suggests that outside the reserves, after years of persecution by thousands of poachers with their poisoned arrows, and by millions of cultivators with their digging hoes, the leopard has learned to be exceptionally cautious and now presents itself as a creature of an exceptionally "shy" nature. But whether the animal really is retiring by nature as well as by force of circumstances, we can't be sure.

The leopard's nocturnal reputation has been accentuated by the black coat of certain individuals (opposite). Named after the dark pigment that invades the hair, melanism is a phenomenon whose precise cause is not known. But it certainly produces a singularly glossy animal. In most instances of melanism, the leopard's usual light background coloring seems to have been "dyed" black or dark brown, leaving the spots to show through vaguely in several parts of the hide. Anyone wishing to check whether the spots are still there should look at a black-leopard skin in a museum, with the sunlight falling on the longer hairs of the rosette patterns of spots. The differentiated coloring shows up clearly. Wildlife experts used to assert that there were two basic kinds of leopard—the plain spotted variety and the black panther. Some observers believed that the black panther was nothing more than a leopard that happened to be black, but many others argued that, as the panther was not only black but often a heavier animal, it should enjoy a scientific category of its own, as distinct as the "snow leopard" of Asia (opposite). Now we know that an ordinary, spotted leopard sometimes produces a black cub along with two or three spotted ones, and this one cub will grow into a "black panther," but it is a leopard all the same.

The panther's dark coloration is associated with dense tropical rain forests. This is especially the case in Malaysia, where as many as half the leopards are believed to be black. Black panthers are also commonly found in Burma, Nepal and Assam, invariably in rain-forest areas. In Africa, where more of the leopard's habitats are to be found in open bushland or scrub savanna, the black leopard is seen less often.

Like lions and many other predators, leopards exhibit some aspects of territorial behavior, restricting their movements to a particular area except when challenging a neighbor for supremacy. Lions are notably territorial, and any encroachment on a nearby area can result in a lot of fur flying. Something similar seems to apply to leopards, though field scientists have

Leopard drinks at watering hole in arid terrain. It adapts to varied habitats from savanna to rain forest.

Asia's snow leopard, even more elusive than African relatives, lives on inaccessible mountain slopes.

witnessed only one territorial tussle between leopards for at least 100 encounters between lions.

One feature of the leopard's territorial system appears to be akin to that of the North American mountain lion, another cat with a solitary life-style. Both species tend to divide up their habitats into two separate territories, one "mosaic" superimposed upon the other. Such, at least, are the findings of Patrick Hamilton, who has taken a lengthy look at leopards in Tsavo Park in Kenya, and Brian Bertram, who has done the same in Serengeti Park. The female leopards have territories that sometimes overlap, whereas males establish territories that are larger and more distinctly separate. The territory of a male may contain substantial sectors, if not all, of the territories of several females; a female's territory may overlap with the territories of several males, or it may lie completely within the territory of a single male. Lions, by contrast, establish territories with virtually no overlap, whether occupied by males or females.

One male leopard in the Serengeti that I studied for more than two weeks roamed over an area 50 miles long and ten miles wide. This is a huge expanse for a single hunter, as much as would often be occupied by an entire pride of lions. Does this suggest that that particular leopard was scarcely territorial at all? Or could it have been a nomadic leopard, obliged to roam from one territory to another of "resident leopards"? We know too little of the leopard's behavior in the wild to say. Nor do we know whether the leopard's territorial behavior is a function of hunting rights or mating procedures, or both.

What does seem plain about the male leopard is that he plays a reluctant role in mating, and no part at all in raising a family. It is the female that "makes the running" at mating time, while the male has to be persuaded out of bored indifference (quite unlike liaisons between lions). The female leopard acts playful, rolling around, flexing her body, circling the male with jumpy movements, exciting him in every way she knows—yet he ignores her until she finally makes her point, whereupon he displays brief practical interest, and that is that.

After mating, the male leopard goes his own way. I have heard of no instance in Africa where a male and a female have been seen to consort for more than a couple of days at most, and never while the female is bringing up her offspring. Leopard cubs appear to be better adapted to hunting techniques than are young lions or cheetahs and they do not stay with the mother much beyond half a year, when they are able and ready to make their own way in the wilderness world. Rarely are two apparently adult leopards found together, but close investigation almost always reveals that one is an adolescent cub. Yet this observation seems to apply only to leopards in Africa: in India and other parts of Asia, entire families of black panthers have been seen together around a carcass.

For all the mystery about its actual behavior, some of the traits commonly ascribed to the leopard are based only on myth and superstition. The leopard's supposed inclination to hunt Man's domestic stock, if not Man himself, is an example. There are plenty of old-timers' tales about leopard marauders in Africa and Asia. For instance, a colonial game warden in southeastern Nigeria, Dennis Gibbs, whose other ac-

Black panthers, leopards whose dark coats obscure the spots, frequent Asian rain forests, are rare in Africa.

From the branch of an acacia tree, leopard can scan terrain below for prey at a distance. Its agility

in trees gives it an extended ecological niche in
realm it does not share with any other major predator.

The leopard's adaptable nature

counts of wildlife seem to be reputable, stated that during the course of five years in the late 1940s a leopard was apparently responsible for the deaths of many dozens of people, most of them women and young children, until it was dispatched by his rifle. But this leopard, like many another that turned stock raider if not man-killer, was found to have a deformity: it had lost part of a paw, possibly in a poacher's trap. Unable to cope with its normal wild prey, it turned its attention to easier sources of food. A similar explanation applies to virtually all instances of leopard-Man conflict that I have analyzed.

Because of its refined hunting technique, the leopard is able to live off a broad spectrum of prey, far more than is the case with the lion or the cheetah. In the main, the lion is obliged to hunt creatures of roughly its own size and weight. If nothing else is available, it will chase smaller-size prey, but it expends an undue amount of energy in doing so. The leopard, by contrast, specializes in being a generalist. When there is a choice, the leopard hunts antelope of the 150-pound class, such as impalas and the larger gazelles, or young zebras and wildebeests; but it also kills many smaller creatures, such as oribis, dik-diks and klipspringers. Indeed, a leopard can turn its paw to a wider range of prey than any other great hunter.

Not only does the leopard avail itself of many types of food, it can survive in virtually all kinds of habitats found in Africa south of the Sahara. In grasslands and in arid areas, in thornbush and in scrublands, in rain forests and in semidesert zones, along coasts and on mountains, the leopard is at home. There is a Leopard Point on the crater rim of Kilimanjaro in Tanzania.

In numerous localities of modern Africa, Man has poached gazelles and zebras and wildebeests off the map. In still more numerous localities, he has taken over wildlife habitats for his cattle and sheep and goats, if not for his grain farms and banana plantations. When this happens, the lion, cheetah, wild dog, hyena and other major carnivores may at first threaten the domesic livestock, but quickly fade from the scene.

Fangs bared, this female leopard is not going after some prey, but threatening a male on the ground.

The most persistent predator

Not so the leopard. I have heard from the Kamba in Kenya, the Chaga in Tanzania, the Matabele in Zimbabwe, and from several others of the more densely settled tribes in Africa, that even when their farming communities rise in density to several hundred persons per square mile, an occasional leopard still manages to hold out. Even if they do not come across its tracks and other signs, they realize that no other hunter could soundlessly snatch a dog from the doorway of a village hut.

In short, the leopard is a master at substituting one kind of prey for another. When antelope, including the smallest species, disappear from an agricultural area, the leopard turns to young goats and calves and chickens—and even to the rats. Because of its adaptability, the leopard's numbers are not plunging so rapidly in modern-day Africa as is the case with most wild creatures. True, the leopard's numbers are declining in most sectors of its remaining range in Africa. But during my travels around Africa I have encountered many reports of leopards still surviving in virtually every region of the continent.

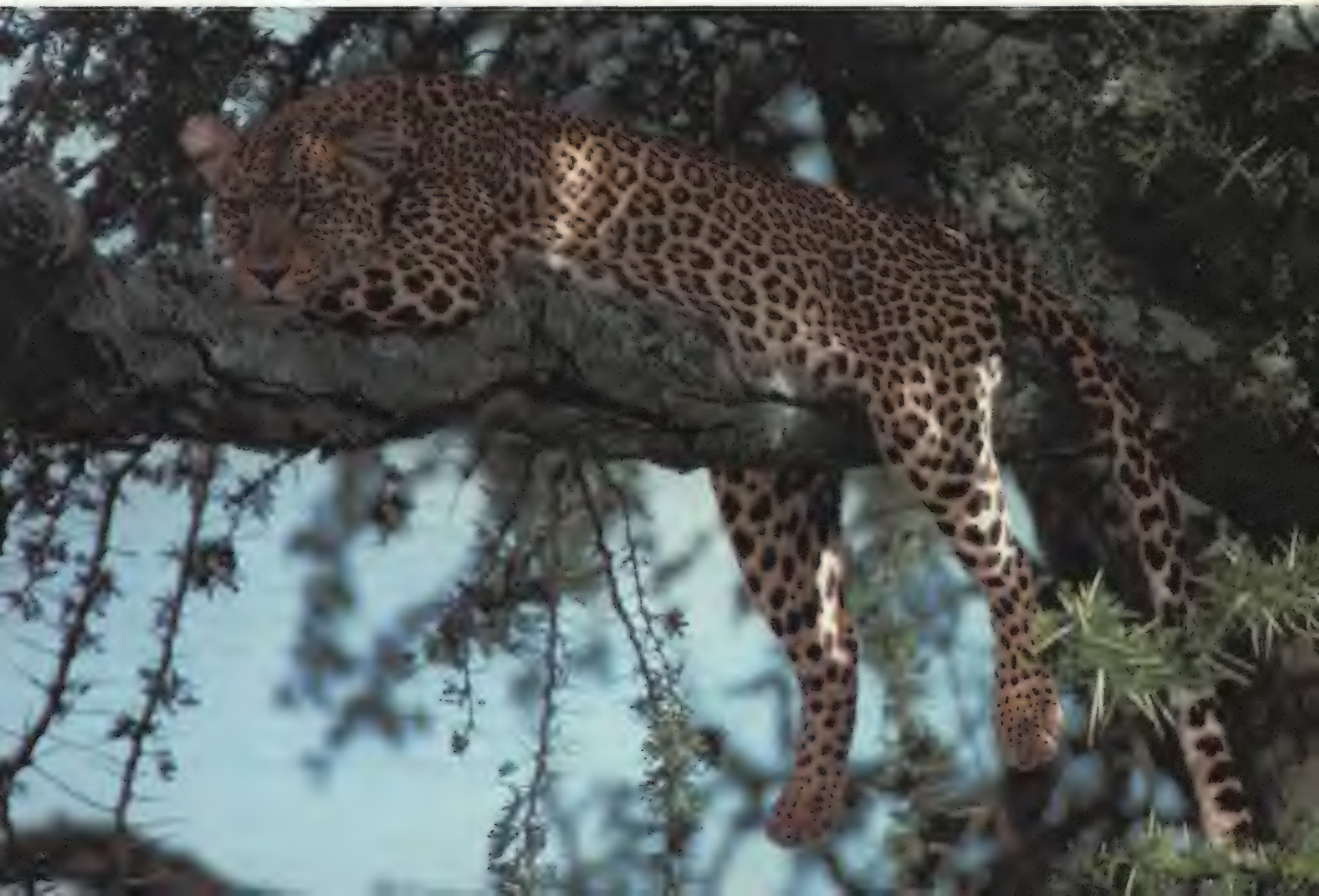
Its numbers are a trifling fragment of what they were in 1950, but the species is far more numerous than the lion, which has probably been reduced below its last 50,000—while the cheetah now totals no more than 10,000 at the most. Moreover, the leopard's re-

maining range in Africa is probably several times that of the lion and many times that of the cheetah.

Despite this relatively favorable status, the leopard still should be considered as threatened. Trophy hunting by American sportsmen is regulated by the Endangered Species Act; and the leopard is denied to the international fur trade by the Convention on International Trade in Endangered Species. The main problem now does not lie with traps, snares and guns; these will rarely eliminate a leopard population entirely, even though they can severely deplete it. Only one agency represents a terminal threat to the leopard, and that is poison. Poison is readily and cheaply available in savanna Africa, and it is coming into rapidly increasing use on the part of stock raisers who see their livelihood increasingly threatened by wild predators. Even though sheep and cattle may be taken more often by lions, cheetahs, hyenas and other carnivores, the leopard is more inclined to scavenge than the others (except the hyena), a trait that makes it especially susceptible to "treated" lumps of meat left lying around in its habitats. Major stock-raising countries of Africa —Kenya, Somalia, Ethiopia, Namibia and Zimbabwe— have seen nine out of ten of their leopards disappear during the course of the 1970s, so efficiently can poison serve to clear whole landscapes of them. Indeed, the experience of South Africa demonstrates that a country can eliminate virtually all its leopards in relatively short order, leaving only relict populations in parks and reserves.

Nevertheless, the survival prospects of the leopard will probably continue to be disproportionately better than those of the lion or cheetah. Although its numbers will steadily dwindle, the leopard can hang on in such unlikely localities as ravines and desert wadis and mountain moorlands, and in other types of terrain that are too broken or arid or inaccessible to be taken over by humans in the foreseeable future. This all means that by the year 2000, when growth of human numbers and growth of human expectations will have caused Man to transform many natural environments throughout the length and breadth of Africa, and many present wild lands will have been converted into mealie patches from one horizon to another, there will still be a scattering of remote and harsh habitats with their populations of leopards.

In Serengeti Park, a female leopard lolls on a branch where she rests during day, hunting mainly at night.



Inaugurating the airmail on May 15, 1918, Lieut. Torrey Webb takes his Jenny from Long

By Donald Dale Jackson

Up, up and away (but just barely) with 'Aerial Mail'

Snow, rain, gloom of night and the 'Hell Stretch' imperiled those daring pilots who got the postal service off the ground

It was sometime between midnight and dawn on May 15, 1918, a night that Capt. Benjamin Lipsner of the U.S. Army would remember as one of the longest he ever endured, that doubts began to drain his confidence. Lipsner's duty on that spring morning in Washington, D.C., was to supervise the inauguration of a bold and daring experiment that the Army and the Post Office Department had agreed to try—the first continuous scheduled daily airmail service in the world. Now, as he restlessly roamed the streets of the capital before sunup, all he could think about was the appalling number of things that could go wrong.

The plan had been worked out over months of delicate negotiations among the Post Office, the Army, Curtiss Aeroplane and Motor Corporation and the owners of potential landing strips in New York, Philadelphia and Washington. Army pilots flying Curtiss biplanes, Hispano-Suiza-engined modifications of the "Jennies" that the military used to train cadets for service in France, were to take off simultaneously from

Island headed for Philadelphia. There another plane was to carry the mail to Washington.

fields at Belmont Park racetrack on Long Island and the polo grounds in Washington's Potomac Park. The planes from both directions would land at Philadelphia, where fresh aircraft and pilots would take the mail the rest of the way. The trip between New York and Washington was expected to take three hours.

Lipsner ruefully recalled the Congressional skepticism that had defeated so many earlier proposals for airborne mail. There was also the fear that President Woodrow Wilson, who led the list of dignitaries invited to witness the Washington takeoff, might decide not to come. Even worse, what if the President showed up and something awful happened? The plane that was to carry the mail pouches from Washington was due to be flown in that morning from Philadelphia. A mechanical breakdown could send a disappointed President back to his limousine.

There was also the possibility that the plane could fail to clear the high trees that surrounded the polo grounds. Flying the mail was an adventurous and high-risk calling, and in the ensuing nine years the postal pilots would test their skills and nerve almost daily. Crashes would eventually number in the hundreds, and 43 men would die in this service.

The tormented Lipsner forced himself to eat breakfast. He noted that the weather was clear and bright. That banished one anxiety. Others remained. The plane from Philadelphia was to be flown by Maj. Reuben Fleet, officer in overall command of the Aerial (later Air) Mail Service. But the flier who was given the honor of making the maiden postal flight out of Washington had only recently won his wings. Lieut. George Leroy Boyle had been selected less for his skill than for his political luster: his fiancée was the daughter of an Interstate Commerce Commissioner.

This article, with the accompanying illustrations, was adapted from Donald Jackson's book, Flying the Mail, *which will be published this month as part of the Time-Life Books series,* Epic of Flight.

Getting the mail off the ground

At 10:35 that morning, Fleet's craft glided over the trees and swerved past the bandstand at the far end of the field. The several thousand onlookers pressed forward as Fleet rolled the plane to a stop and got out, but the police, using their bicycles as barriers, kept them in check. The field was suddenly alive with activity. Leather-jacketed Lieutenant Boyle, his aviator's goggles pushed up on his forehead, stepped forward to study a map—an ordinary road map that Fleet spread out on the side of the plane. The lieutenant struck one spectator as oddly matter-of-fact under the circumstances. "He wasn't nearly as excited as I would have been," recalled Paul Garber, then an 18-year-old Army sergeant who went on to fly with the Air Mail Service, and ultimately became head curator of the National Air and Space Museum.

The eminent guests began to arrive—Alexander Graham Bell, Robert Peary, Postmaster General Albert S. Burleson, Navy Secretary Josephus Daniels and his assistant, 36-year-old Franklin Delano Roosevelt. Lipsner conferred with Second Assistant Postmaster General Otto Praeger, who would run the airmail for its first three years. Finally a caravan of cars drove up and President and Mrs. Wilson emerged.

A moment later a Post Office truck pulled alongside the plane and workers transferred three pouches of mail—two bound for New York and the third for Philadelphia, 124 pounds in all—to the forward cockpit of the "Hisso-Jenny." Boyle climbed into the rear seat and strapped himself in. A mechanic standing by the propeller shouted "Contact!" Boyle turned on the switch, and the mechanic, at the head of a chain of five men, pulled hard on the prop. The engine coughed once and died. They tried again with the same result. Lipsner heard a voice say, "We're losing a lot of valuable time here." It was the President.

Major Fleet, who had flown this plane only an hour earlier, ordered his mechanic to check the gas tank. Empty. Red-faced mechanics filled it. They cranked the prop again. This time the engine responded.

Right: Reuben Fleet straps a map on George Boyle. It didn't help.

Manufacturer H.P. Mingle turns new mail plane over to Otto Praeger.

President Wilson, Lipsner and other relieved spectators watched Boyle taxi into position and then start his takeoff toward the trees. He cleared them by what looked to Lipsner like three feet. Gazing at the frail craft as it climbed and turned, both Lipsner and Paul Garber had the uneasy feeling that Boyle was heading in the opposite direction from Philadelphia.

The melancholy confirmation came an hour later when Lipsner received a telephone call from a chastened Boyle; he had flown south instead of north, he reported, because his compass "got a little mixed up." He had landed on a plowed field near Waldorf, Maryland, 25 miles from the capital, and broken the prop.

On the airmail's second day, Lieutenant Boyle proved once again that cross-country pilots needed six senses and he was one short. Major Fleet, asked by the Post Office to give the well-connected Boyle another chance at the Washington-Philadelphia run, decided that this time he would escort him as far as Baltimore to see that he got started in the right direction. Then, Boyle was told, he should keep Chesapeake Bay on his right. He followed these instructions so faithfully that he wound up several hours later at Cape Charles, Virginia, having circled two-thirds of the bay. Taking off again, he managed to reach a polo field near Philadelphia before he ran out of gas and crash-landed, breaking a wing. The Post Office asked that Boyle be given a third chance; Fleet sent him back to flight school.

Pilot Wesley Smith sees his mail loaded on a truck at Bellefonte, between New York and Cleveland.

Over the Hell Stretch

By August 1918, the Army airmail pilots had been replaced by civilian fliers. Praeger, eager to extend the service westward, announced plans to initiate a route to Cleveland and Chicago. Max Miller and Ed Gardner, the best of the civilian pilots, were selected to check out the proposed route in a two-plane test flight. This would be the Air Mail Service's first encounter with the Allegheny Mountains, which were to bedevil later pilots. It wasn't their elevation that made the Alleghenies tortuous, but rather the unpredictable weather and the scarcity of landing sites. Pilots came to call them the "Hell Stretch" and the "Graveyard."

Ben Lipsner, briefing Miller and Gardner on the flight, was not above exploiting their natural rivalry. Their scheduled refueling stops, he explained, were Lock Haven, Pennsylvania, Cleveland and Bryan, Ohio, 160 miles east of Chicago. Miller would take off first, with Gardner to follow. "What do you mean, follow?" Gardner exploded. "Do you think I'm a baby?" All right, Lipsner allowed, Gardner would go first. "I couldn't follow him for a mile without running him down," Miller retorted.

It would be, of course, a race, but Lipsner tried hard to convince them that it was performance that counted, not who got there first. A coin toss gave Max Miller the right to start first, and Lipsner set off for the finish line—by train.

The weather in New York was forbidding when Miller took off from Belmont Park at 7:08 A.M. on September 5th. "Look me up when you get to Chicago, Max," was Gardner's final message.

Lipsner, warming a desk at the Chicago Post Office and waiting for his open phone line to ring, heard first from Miller. "Where's Eddie?" he demanded. "Never mind. Where are you?" Lipsner replied. "Lock Haven. Radiator's leaking." Lipsner, noting that he was on schedule, told him to have the radiator fixed and get moving.

Twenty minutes later the phone rang again. "This is Gardner. Where's Max?" Gardner had fought his way through a storm to Wilkes-Barre. Lipsner reported that Miller was at Lock Haven. Gardner climbed back into the storm, but was soon forced to land again with engine trouble. It was 2:16 that afternoon by the time he finally reached Lock Haven.

Miller, meanwhile, was battling not only the storm but other obstacles. An overheated engine forced him down on a Pennsylvania farm, and a shotgun-toting farmer ordered him to vamoose.

Miller got airborne again, made two more brief stops to water his radiator, then checked in with Lipsner at 4:25 from Cambridge, Ohio, where he had to wait two hours while the radiator was patched. He was

Floodlight helps pilots at Omaha train for scheduled night flights that began in the summer of 1924.

pleased to learn that Gardner was grounded by weather and a still-unresponsive engine in Lock Haven. After two more stops he finally set down at 8:25 on the outskirts of Cleveland. Lipsner, whose goal was to have both pilots in Chicago by nightfall, took what solace he could from the fact that both were still intact.

Miller's irksome radiator kept him in Cleveland until 2:15 the next afternoon, by which time Gardner was flying through a friendlier sky and approaching Cleveland from the east; he was finally making a race of it. Miller stopped for 30 minutes at Bryan, taking off at 4:45. Gardner landed six minutes later. At 7 P.M. Miller landed at Chicago's Grant Park.

Spotting Lipsner as he unbuckled his belt, he yelled, "Where's Eddie?" Lipsner told him that he was close behind. Miller, believing that Gardner had taken a shortcut over Lake Michigan, fretted that he had lost his way in the darkness and volunteered to take off again and look for him. But a few minutes later Gardner checked in by phone from Westville, Indiana. He had run out of daylight. He flew into Chicago the next morning.

Such troubles persuaded the airmail chiefs to wait a year before launching a route over the Alleghenies. By then a conflict had erupted between pilots and Post Office. Otto Praeger, anxious for Congressional support of the airmail, insisted that his pilots fly in even the most wretched weather. A nonflier, Praeger had convinced himself that the danger found in training "is almost entirely absent from commercial flying." He contended that pilots could take off with low visibility if their destinations were clear. The pilots wanted to navigate the only way they could—by sighting the ground. Compasses were unreliable.

Friction grew when service began between New York and Cleveland, by way of Bellefonte, Pennsylvania. A spell of bad weather produced a series of

Airmail DH-4 skims through the Rockies in 1921 when engine failures were all too common.

accidents. The pilots went on strike. It lasted only a day. Then Praeger and his pilots agreed that if a field manager approved of the weather but the pilots didn't, the manager would go up himself to prove it was flyable. If he couldn't fly he'd get in the mail pit and get taken up. "That was a hell of a place," said one old-timer. "The manager wouldn't give you any push in a case like that."

The mail pilots began flying from coast to coast during daylight hours in the fall of 1920, braving both the Rockies and the Sierra Nevada in war-surplus de Havillands. They flew in relays, changing planes and pilots at Chicago, Omaha, Cheyenne and several other stops. The men who flew west of Cheyenne could expect a new and perilous adventure almost daily.

James Murray was caught in a blizzard between Salt Lake City and Cheyenne in October. Trapped below the high peaks with only a seamless wall of white in front of him, he slid into the side of a mountain. Unhurt, he spent a cold and hungry night, then mushed 17 miles through the snow to reach a village. The men sent out to retrieve the mail found the plane by tracking a bear that had trailed the pilot.

Night flying through winter storms

A series of accidents in late 1920 and early 1921 killed 12 men. Evidence mounted of sloppy maintenance and recurrent late or incompleted flights. On February 21 a short news item from Omaha contained the first hint that Praeger and company had found a way to revive the airmail's dwindling reputation. The story said that planes would leave San Francisco and New York the next morning in an unprecedented attempt to make a continuous *day-and-night* flight across the country.

Congress, by no coincidence, was due to vote on the airmail appropriation the following day. Unfortunately the timing, while fine for politics, could hardly have been worse for the pilots. They would be contending with short days, the risks of blizzards and midwinter temperatures and a largely unlit airway.

Darkness still cloaked the San Francisco hills when pilots Farr Nutter and Ray Little lifted their de Havillands over the Golden Gate on the morning of the 22nd and headed for the Sacramento Valley and the High Sierras. Back at Hazelhurst Field on Long Island, pilot Elmer Leonhardt took off at 6:04 and Ernest Allison followed ten minutes later. At Reno, Nutter turned his mail pouches over to Jack Eaton and Little gave way to William Lewis, who was spending his last month as a bachelor before a scheduled March wedding. Flying head-on into the rising sun, Eaton and Lewis followed the railroad tracks across the Great Basin country to Elko, Nevada, landing six

Wreckage in the Alleghenies marks the spot near Bellefonte where mail pilot died heading west.

minutes apart. Eaton was off again for Salt Lake City after only seven minutes on the ground. A few moments later, climbing out of Elko, Lewis stalled and plunged to his death.

Leonhardt and Allison meanwhile glided into the little field at Bellefonte, refueled and set off across the Hell Stretch in thickening mist. Leonhardt was soon forced down by the weather. Allison fought through to Cleveland and transferred his mail to Wesley Smith, who flew on to Chicago, arriving just as a storm front smacked into the city from the west.

Dean Smith and Bill Hopson were standing by at Chicago's Checkerboard Field to fly the next lap to Omaha. "It started snowing hard," Smith recalled recently. "Hoppy took the first section when Wesley Smith came in. He went up and came back ten minutes later and said we couldn't get through. I was content to take his word for it."

The white peaks of the Wasatch Range glistened in the midday sun as James Murray, the flier who had been tracked by a bear a few months earlier, took the relay from Eaton in Salt Lake City. Murray, who had flown the high country all winter, cruised over the Continental Divide, crossed the rugged Medicine Bow and Laramie Mountains, and touched down in Cheyenne a little before 5 o'clock. Frank Yager took off five minutes later on the run over the prairie to North Platte. The weather was still clear, but darkness caught him near his goal. The crew at North Platte ignited a bucket of gasoline to give him light.

The next lap, from North Platte to Omaha, would be the first real test of the feasibility of night flying over an unmarked route. Jack Knight, recognized as one of the finest airmail pilots, had drawn the first night flight to Omaha. Knight was to fly the same plane that Yager had brought in, but Yager broke a tail skid on landing.

It was 10:44 when Knight finally took off. Clouds obscured the moon as he climbed to 2,200 feet and leveled off above the dim silver strand of the Platte River. The glow of bonfires built by residents of the river towns of Lexington, Kearney and Grand Island told him that he was on course. He picked up the lights of Omaha, then spotted a U-shaped row of red lights identifying the runway. Thinking about the good meal and warm bed that awaited him, he gunned his engine to announce his arrival and dropped down onto the Omaha field, where a crowd of some 2,000 watched him land at 1:10 A.M.

Field manager Bill Votaw greeted Knight with bad news: the pilot who was due to relieve him was still weathered in at Chicago; snow showers were predicted along the 440-mile route across Iowa and Illinois to Chicago. Knight had never flown the Omaha-Chicago route, not even in daylight. Votaw couldn't order him to fly. Knight tore out a section of a road map showing Iowa and Illinois and said he'd go.

Flying east over Iowa in fair visibility, Knight soon spotted the lighted dome of the state capitol in Des Moines. "I was fairly dead for lack of sleep," he reported later. "I was constantly on the verge of dozing. I gripped the control stick with my knees and began slapping my hands together."

This DH-4 mushed into deep snow on a mountain at Rock Springs, Wyoming, in January 1922.

Charlie Ames died in the cockpit of this wrecked plane, only a few miles from his destination.

Past Des Moines a snowstorm snapped him to alertness. The snow blotted out his horizon and forced him lower and lower until he skimmed the treetops. About 15 miles out of Iowa City he sighted a railroad and followed it into town.

Running short of fuel, Knight circled the slumbering town in a vain search for the airfield. The ground crew at the Iowa City field, believing all flights for the night had been shut down, had gone home. Finally, a watchman lit a flare that enabled Knight to make a bumpy landing at 4:45 A.M. The crewmen, roused by the sound of his motor, showed up to service the plane while Knight phoned Chicago and munched a sandwich. The word from Chicago was that the weather was finally clearing.

Knight napped fitfully as he waited for a break in the clouds over Iowa City so he could take off. At 6:30 he embarked on the last 200-mile stretch. Steering northeast as the first shafts of light crept over the horizon, he began to see lantern-toting farmers doing their morning chores. Now, with the night and the snow both behind him, he was sure that he would make it. Checking his map, he began to pick up landmarks on the outskirts of Chicago. Over the city his engine sputtered. "I was within gliding distance . . ." he said later, "so I said, 'Just spit, old boy, we're here.' "

The Chicago crewmen, who had kept flares burning for him, saw Knight circle the field twice and then ease down to a perfect landing at 8:40 A.M. Photographers and reporters swarmed around him as the crew transferred the mail to a plane piloted by Jack Webster. Webster took off for Cleveland while an exhausted Knight attempted to cope with the demands of sudden celebrity.

Why was his nose encased in adhesive plaster, reporters wanted to know. A week earlier, he explained, he had broken his nose, his plane and a couple of pine trees when he crashed in Wyoming's Laramie Mountains. "Then I found a town and went back to work." What about the flight from Omaha? "I got tangled up in the fog and snow a little bit," he said. "Once or twice I had to go down and mow some trees to find out where I was."

Webster sped on to Cleveland and passed the postal torch to Ernie Allison, who flew the last leg over the Hell Stretch to New York and arrived at 4:50 P.M. on the 23rd—33 hours and 20 minutes after Farr Nutter had left San Francisco. Congress got the message: the airmail's $1.25 million appropriation was approved.

By the summer of 1925 the U.S. airmail organization that had begun seven years earlier with a few Army pilots and a fleet of Hisso-Jennies was at its

Jack Knight, plaster on previously broken nose, relaxes after first night flight, complicated by snow.

pinnacle. It operated a far-flung network of routes and fields and beacons and hangars and radio stations smoothly and efficiently and for the most part safely (there were only three deaths in 1924 and just one in 1925). American mail pilots were the most skilled cross-country aviators in the world.

The final conquest, perhaps the sweetest of all, was the establishment of night flights over the Hell Stretch between New York and Chicago. The first three months of night runs justified the enthusiasm. The Post Office reported that 100 percent of the miles scheduled to be flown in August were in fact flown. Many concluded that the Alleghenies had been tamed. They were wrong.

Moustached, courtly Charlie Ames gunned his engine on Hadley Field, New Jersey, a few minutes before 10 P.M. on October 1, 1925, and took off into an overcast with a 5,000-foot ceiling. As he headed west over Bethlehem and Allentown, Pennsylvania, enroute to his first stop at Bellefonte, he found a 1,500-foot ceiling and 15-mile visibility. It wasn't good, but the 31-year-old Ames had flown in a lot worse. As he droned past the first ramparts of the Alleghenies, thick clouds were settling over the hills. He had enough fuel for four and a half hours, which would almost get him to Cleveland. He was due at Bellefonte at 11:30.

Bellefonte field clerk Charlie Gates went to the airport that night to see if the planes were getting through. Flights had been scrubbed and Ames was flying the only plane due in. By now the clouds on Nittany Mountain, situated to the east of the field, were below the peak. Gates started calling emergency fields east of Bellefonte to see if the caretakers had spotted Ames. Sunbury, 50 miles away on the Susquehanna, reported that he had passed. The man at 30-mile-distant Hartleton said he'd been there, too. The caretaker at Woodward, only 22 miles from Bellefonte, said he had heard the plane but had not seen it. Gates and the other crewmen went out to listen.

By 3 A.M. it was obvious that Ames was down somewhere—his gas was gone by now—but where? The Bellefonte men phoned farmers along the route; no one had heard a crash. As another foggy morning dawned, a group began to search the hills. The locals knew that if Ames lay injured somewhere in this wilderness, it could take days to find him.

On Monday, October 5th, the story of the missing pilot was on the front page of the *New York Times*. More planes continued to search. Pennsylvania National Guardsmen and a thousand students from Penn State joined in.

Ten days after he had vanished, Ames and his plane were found on Nittany Mountain. The pilot had died of a fractured skull when he smacked into the mountainside about 200 feet below the summit, shearing off trees and smashing into a large rock. The autumn foliage had concealed the wreckage so effectively that earlier searchers had come within a few dozen feet of the plane without seeing it. Investigators surmised that Ames thought he was several hundred feet higher than he was because his altimeter had not allowed for the difference in barometric pressure between New Jersey and Bellefonte. A mechanic promptly set about devising an altimeter with a built-in barometric correction, too late for the unlucky Charlie Ames but not for those who came after him.

At the behest of Congress, two years later the government bowed out of airmail flying and let private firms take over the business. The magazine *Aviation* said in a valedictory salute that "the United States airmail endeared itself to all who gave their best efforts to the development of aviation."

It endeared itself especially to those who served it best, the pilots. "I loved what I did," reminisced pilot Hamilton Lee recently. "We could fly at any altitude, fly under bridges, drop a newspaper to our friends if we wanted to. Today they sit up there at 35,000 feet. What fun can they have? Oh, those were great days. They were dangerous days, too, but you didn't mind that. If it wasn't for that memory I'd go nuts. I live on it. I still think about it when I go to sleep at night."

"Wild Bill" Hopson in winter flying gear typifies tough-as-nails pilots who first flew the mails.

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Article and photographs by Raghubir Singh

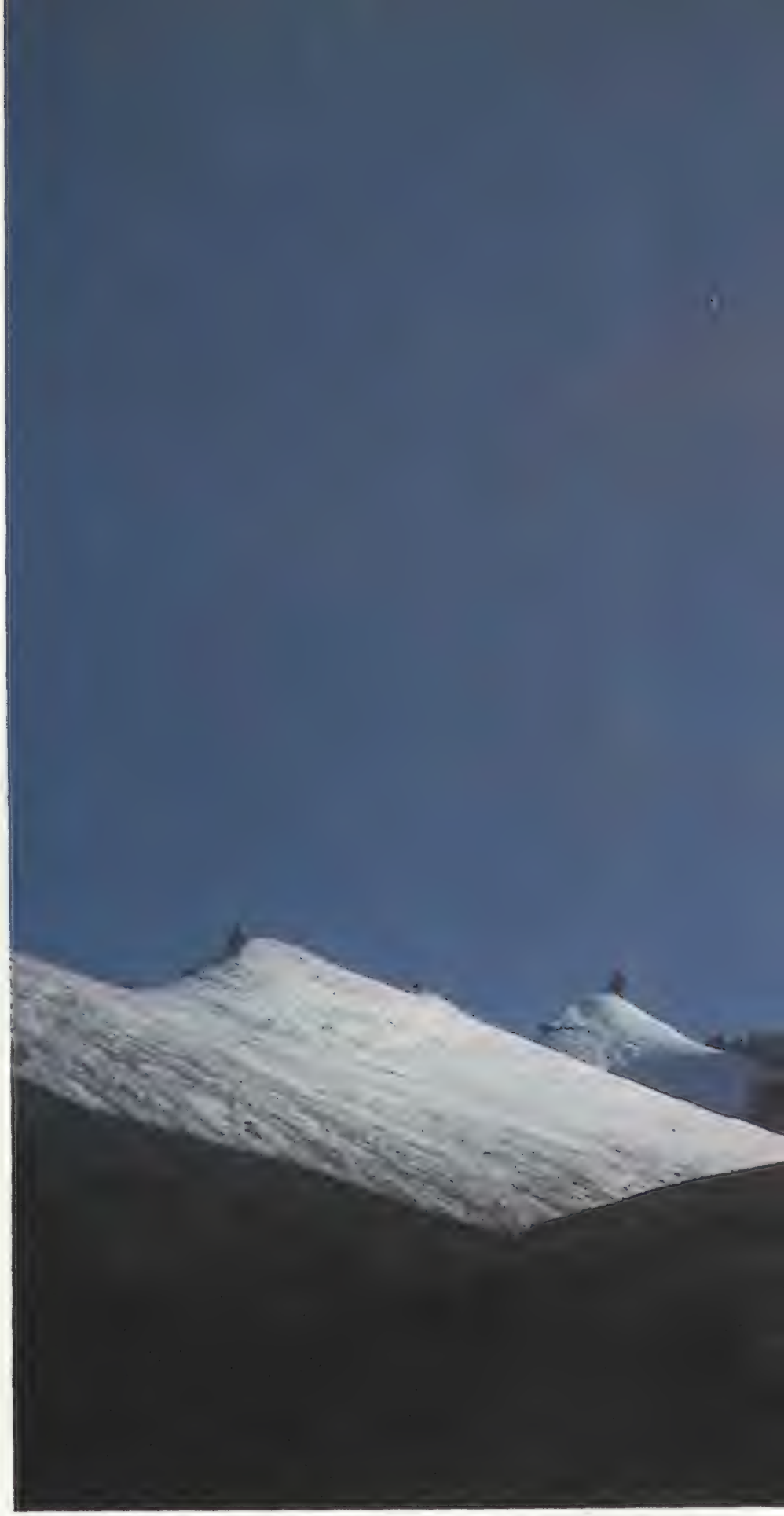
Pilgrims return to Kailas, Tibet's sacred mountain

Closed to devout Indians for 20 years following the border war with China, the age-old route to the 'Jewel of the Snows' is once again open

Since childhood, my mind has been held captive by a 22,027-foot-high silvery mountain and a 14,950-foot-high lake in western Tibet. For centuries, Kailas has been to Hindus and Mahayana Buddhists what Mecca is to Moslems, what Mt. Olympus was to the ancient Greeks and what Jerusalem was to the medieval Christians. And from the age of the Aryans to the age of the atom, Kailas, the holiest of all mountains, and Manasarowar, the holiest of all lakes, have inspired the art, the architecture, the literature and the life of two of the world's great civilizations, India and Tibet. Through the centuries, devout and determined Indians have flocked by the millions to revere this holiest of places.

But in 1962, because of border hostilities between India and China, the pilgrimage route to Kailas was closed to Indians. Only last September—after almost two decades—was the route reopened by the Chinese to the great joy of the Indians. And I was a member of the first group to make the pilgrimage after this historic reopening.

As a child, through the warmth of my mother's words, I absorbed the mystery of Kailas and Manasarowar. In the kitchen while she cooked, at meals and bedtime, she told me stories from the great Indian epics, the *Ramayana* and *Mahabharata*. Says the *Ramayana:* "If the earth of Manasarowar district touches any man's body, or if he bathes in the lake, that man shall go to the paradise of Brahma, or he who drinks its waters shall know the heaven of Siva."



Mt. Kailas (22,027 feet) rises majestically above one of western Tibet's highest mountain ranges.

But my mother had never made the arduous pilgrimage. Like millions of Indians, she was content to worship Kailas and Manasarowar sight unseen, the former as Mt. Meru, axis of the universe and home of the god Siva (SMITHSONIAN, May 1981), and the latter as the Lake of the Mind, fashioned by Brahma, the creator. In the lake's center grows the divine Jambu tree, which is invisible to human eyes. The fruit of this tree transforms the waters of Manasarowar into a

life-giving elixir. However, my mother *had* visited the Himalayan shrines along the Ganges, which she extolled along with its mythical birthplace, the slopes of Kailas. From there, the Ganges River, according to tradition, divides into four streams and flows out for the good of mankind.

Inspired by my mother's devotion, I made the Ganges my passion. After I finished college I spent six years traveling intermittently along its banks. Four times I trekked to the true geographical source, an ice cave in the Gangotri Glacier. But Kailas remained impressed on my mind, although I was not a devout Hindu—and even though it was then out of reach for me.

Even after the pilgrimage route to Kailas was closed, the mountain continued to haunt me. I often read Jawaharlal Nehru's moving words in the foreword to *Kailas-Manasarowar,* a book written by explorer Swami Pranavananda, who had circled Kailas 36 times

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between 1928 and 1959: "I had worked out many a plan for paying my homage to this wonder lake of Tibet and snow-covered Kailas nearby. But those plans remained unfulfilled, for my journeys led me elsewhere and I was filled with regret that I would never reach Kailas and Manasarowar."

Nehru died in 1964, shortly after the war that sealed the border. Then, very slowly, a decade and a half later, those troubled snows of the Himalayas began to thaw. During the interlude, when Indira Gandhi was out of power and the Janata Party ruled, China and India made friendly overtures to each other. There was one unexpected and exciting result. Subramaniam Swamy, a Chinese-speaking senior member of the Janata Party, later told what had happened: "It was in 1978 that I met with the Chinese Deputy Prime Minister, Ji Pengfei . . . I asked him about the pilgrim route. Surprisingly, the Chinese leader had never heard of the place!" It was 1980 before the Chinese agreed to open the route, and it took another year to work out details.

In August 1981, the front-page news riveted me: after 20 years, three groups of pilgrims would be leaving for Tibet in September and October. Applications had to be in within a week. A thousand persons applied. Lots were drawn and luckily I was picked to be among the 60 pilgrims.

The seven-day trek to 17,600-foot-high Lipu Lekh pass (right) on the Tibetan border began in Uttar Pradesh state when we crossed a footbridge over a stream and entered the land of the Bhutias. They had traded with Tibet until 1962, buying and bartering ponies, mules, yaks, sheep, wool, borax and salt with barley, wheat, rice and utensils. Now their trade was limited to neighboring Nepal. Colorfully dressed Bhutia women greeted us with garlands and the men offered us tea, biscuits, apples and cucumbers. As we

Pilgrims trekking to Mt. Kailas approach Lipu Lekh, a 17,600-foot-high pass from India into Tibet.

walked through their villages they shouted *"Kailas yatra, safal ho!"* (May the Kailas pilgrimage be successful!). We responded "Victory to Siva!"

Over sheep trails, past waterfalls, and through narrow gorges, we walked from dusk to dawn for seven days, watched by government doctors. This brought us to our last night's halt before the two-and-a-half-mile ascent to the Lipu Lekh pass.

At dawn, there was a drizzle and the pass lay swathed in snow and cloud. We had to hurry because strong winds very often make the pass difficult to cross after midday. Some pilgrims became sick, others dragged behind. Finally, at 11 A.M., as the sun broke through the clouds and disappeared again, the last pilgrim trudged to the top. The excitement of seeing Tibet made me scramble up a ridge. There, straight ahead, crowned by clouds, was 25,355-foot Gurla Mandhata, the highest mountain in Tibet. Behind this massive mountain lay our destination. Five Tibetans leading a train of ponies met us, loaded our baggage and led us into their country.

We drove in Chinese jeeps past yaks, sheep and goats, tended by herders mounted on sturdy horses. Looming above was Gurla Mandhata. Before we noticed it, we were at the Gurla Pass, skirting a limpid, gray mass of water. "Manasarowar!" I shouted to the driver. He smiled, shook his head, while saying "Poosh" (No, in Chinese). I guessed rightly, that this was Raksas Tal, the eerie and desolate lake that is adjacent to Manasarowar.

Finally we rounded a hillock and did face Manasarowar (p. 98). Some of my companions raced ahead to touch their heads to the soil and raise the waters to their lips and foreheads. A flight of Brahminy kites wheeled over cobalt-blue waters that seemed to be enclosed in a necklace of snow-white mountains.

The dark, deserted Raksas Tal (Lake of the Demons) and vibrant Manasarowar are only two miles apart at one place. Manasarowar, at an altitude of 14,950 feet, is the highest body of fresh water known in the world.

From Manasarowar we drove 16 miles to Tarchen, the much-damaged Buddhist monastery (p. 100) near the southern base of Kailas. Some of us pitched our tents while others prepared to circumambulate Kailas. At the monastery we conversed with four monks in halting Hindi, which they and some of the herdsmen spoke. The herders, other lamas and devout Tibetans daily came through Tarchen to walk around Kailas. It is believed that one circuit around the mountain washes away the sins of one life and 108 cir-

The author is a free-lance photographer and writer who specializes in Indian subjects. He was born in Rajasthan, now lives in Paris.

Sacred trail markers or *chortens*—here alongside Lake Manasarowar—guide and inspire the pilgrims.

cuits secure Nirvana in this very life. Some Tibetans do the 32-mile-long circuit in one day, though for most it takes two to three days. The rare and exceedingly fervent pilgrim also pays homage to Kailas by prostrating. This involves lying flat on the ground, then getting up with a few forward steps, again lying flat on the ground, and so forth—working one's way slowly around the entire mountain.

With a fellow pilgrim, Iyappah Karuppanan, I joked about the armed bandits of old Tibet, trying to make him believe they still existed. As he and a few others left to go around Kailas, I warned him not to lose sight of his two armed escorts. (The militia who patrol the Tibetan borderland were accompanying us as guides.) But my devout friend, standing next to me, was not listening. Facing the cloud-covered Kailas, he was saying a silent prayer. Then he set off.

There were six pilgrims who walked around Kailas. All of them except Karuppanan were adventurers and mountaineers. My friend is a saffron-robed South Indian. A true believer, he was the first to shout "Victory to Siva!" on all the appropriate occasions.

On his return, Karuppanan described his trip around the mountain, which the doctors had discouraged him from making because of his poor health. "On the first day, I was tired but did not have any great difficulty. But on the second day, I thought I was at the point of death when I was climbing up the Dolma-la pass. My breathing was labored and I felt faint. There was knee-deep snow, in which I would have fallen but for the help of a Tibetan pilgrim who suddenly emerged to give me tea. Then he helped me over the pass." After surviving this crisis, Karuppanan finished the circuit successfully.

At Tarchen I waited for the clouds to lift. I had yet to see Kailas. Suddenly, on the morning of our third day at the monastery, the mountain was visible. Immediately I set out to climb its lower range so that I could look directly at its south side; eventually I got up to 18,000 feet. As I climbed, thoughts rushed through my mind. What was it about this regal mountain that had inspired millions of Hindus and Buddhists? Why did nonbelievers as well as believers walk hundreds of miles for a glimpse of it? Why had it

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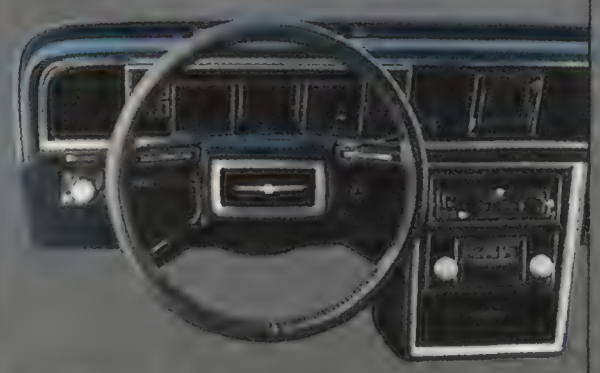

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become a divine symbol, so that no man dared to set foot on its summit?

I could not probe the mysteries of Kailas with the effortlessness and absolute belief of Karuppanan. Explaining the mountain's metaphysical meaning, he had said to me: "The shape of Kailas is in the form of a *Vishwalinga* [the lingam of the world] as if installed on a *yoni* [the female sex organ]. It is in the *stula* form; that is, for the naked eye. Only after very great penance, in his last life, can one see Kailas in the *sukshana* form, that is, as the divine light after closing the eyes. This light is the inner eye. If this inner eye is opened, we can have the ultimate worship of the almighty Siva. The *darshan* [sacred view] of Kailas is an attempt to find the light of god. This is the holiest, the final and the ultimate truth."

My friend Karuppanan is an orthodox Hindu. But I, a Westernized Hindu, have always sought facts of history and geography in order to see through the maze of myths that surrounds us Indians, like the clouds that often veil Kailas. Yet as I climbed higher, the significance of facts and geography faded. I was now facing the scarred, southern facade. Hindus believe two of these scars to be the eyes of Siva.

Following the gaze of Kailas, I turned to look at the vast expanse of the Great Himalayas, stretching from western Nepal to Kumaon in India. I looked down on Manasarowar, sparkling below the serrated stretch of these Himalayan giants.

Like the spokes of a huge wheel, many great rivers flow out of the vicinity of Kailas. These rivers, along with the Ganges, which in myth sprang from Kailas, radiate the life and the thought of India and Tibet. Above them, Kailas, standing in splendid isolation, is the axis of the spiritual world that flows down these rivers and spans the Himalayas.

Deeply moved by the unearthly magnificence around me, I began to understand why our ancients had put Siva, the Buddha and his host of bodhisattvas on top of and around Kailas. The mountain's overwhelming presence cut through the intellectual efforts that I, a nonbeliever, had made to understand it. In *The Way of the White Clouds*, Lama Anagarika Govinda wrote of Kailas: "Only he who has contemplated the divine in its most awe-inspiring form, who has dared to look into the unveiled face of truth without being overwhelmed or frightened—only such a person will be able to bear the powerful silence and solitude of Kailas and its sacred lakes. . . ." And I realized that I, too, had become a genuine pilgrim.

Tibetan nomads rest at doorway of a partially destroyed Buddhist *gompa* near base of Mt. Kailas.

Clasping her hands in devotion, a Tibetan woman prays to Mt. Kailas as she has done all of her life.

Tulum

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By Jim Doherty

Bald eagle thrives as our symbol, survives in the wild

After three committees and six years, this concept was chosen for Great Seal of the United States.

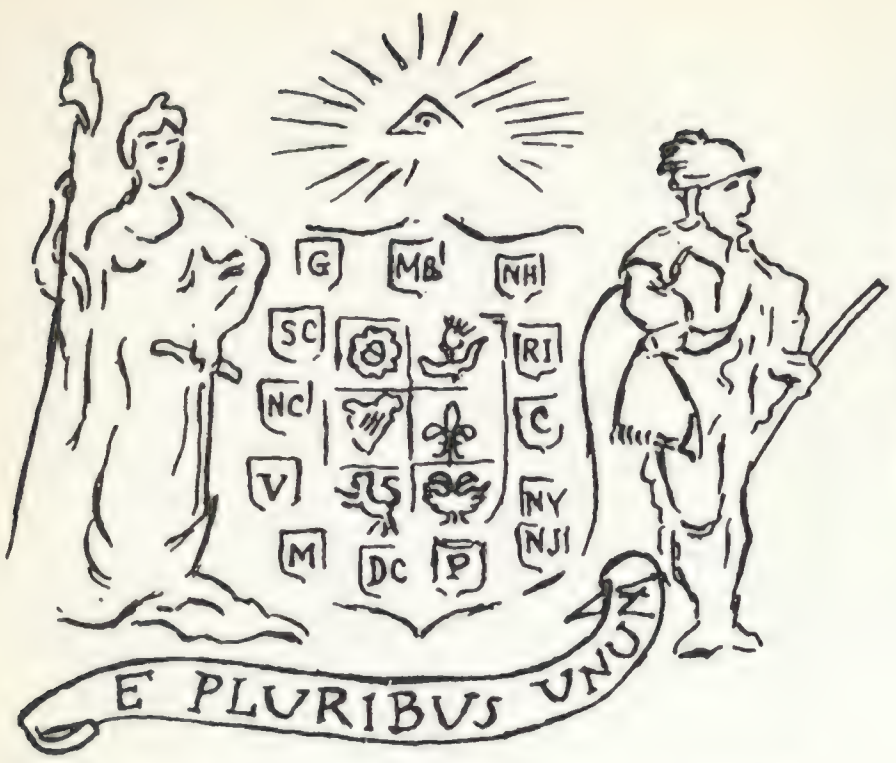
Two hundred years ago this spectacular raptor became the centerpiece of the Great Seal and America's favorite bird

Late in the day of July 4, 1776, after three days of hectic debate, the Second Continental Congress approved the Declaration of Independence. For most of those patriots, it was a moment of supreme exultation. For the author of the controversial document, 33-year-old Thomas Jefferson of Virginia, the approval was anticlimactic at best. Jefferson had not taken kindly to the public editing—"mutilation," he called it—of his manuscript. Beyond that, he was preoccupied with personal worries. His mother had died some months before, then he had fallen ill and now he was anxious to be back in Monticello with his frail wife, Martha, who was pregnant again. But the Congress was not done with him yet.

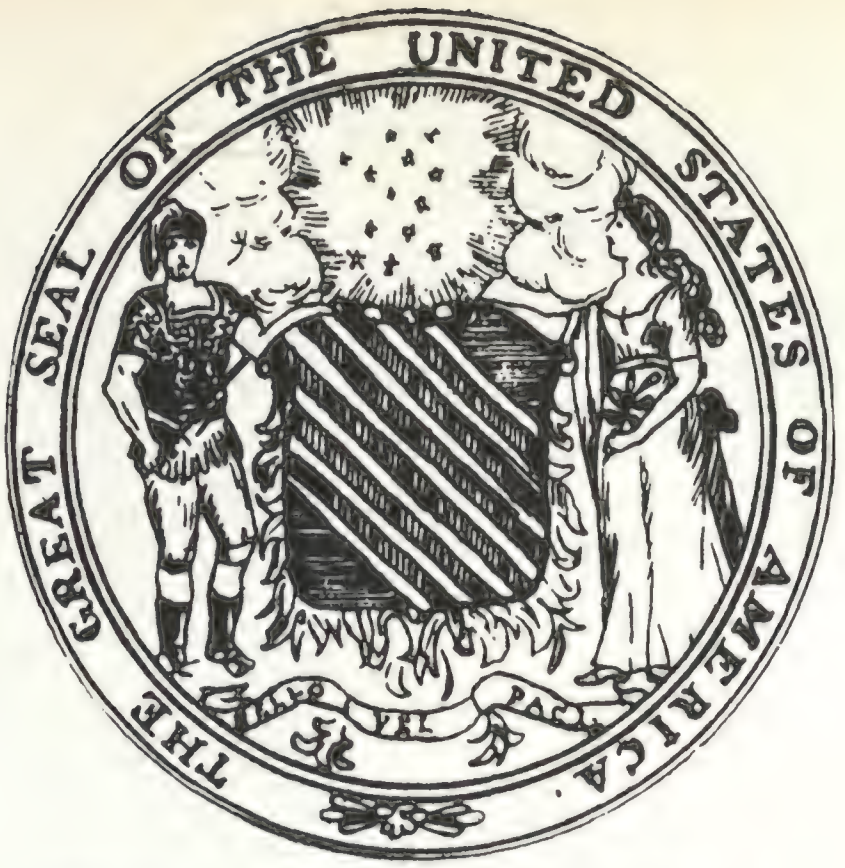
That evening, the delegates designated Jefferson, Benjamin Franklin and John Adams as a committee "to bring in a device for a seal for the United States of America." It was hardly a novel idea. Official seals had been used for centuries as emblems of royalty, symbols of nationhood and motifs for various other enterprises. But devising an insignia for the new republic proved to be an unexpectedly difficult task. Given Jefferson's distractions and his partners' lack of qualifications for the work, it was really not so surprising that the illustrious trio botched the job. In 1780, Congress appointed a second committee and then, in 1782, a third. At last it turned in desperation to its own secretary, an Irish-born businessman and public servant named Charles Thomson, who came up with a bold scheme featuring the American bald eagle as the central element. That did it. Finally, on June 20, 1782 —six years after the search for an emblem had begun and eight months after the decisive surrender of Cornwallis at Yorktown (SMITHSONIAN, October 1981)— Congress adopted the Great Seal of the United States.

If Thomson had proposed some other device, it is not likely America's fortunes would have been much affected, but the bald eagle's might well have been. Prior to 1782, that spectacular raptor was little noted by the inhabitants of the British colonies. After its elevation to the Great Seal, the eagle's likeness was suddenly everywhere. In the first part of the 19th century, no article of furniture, tableware or architecture seemed complete without one. Screaming eagles flew or perched on homes, sailing ships, tavern signs, weather vanes and public buildings; on butter molds, cider jugs and silver tankards; on cuff links, playing cards, military headwear and drums. By the 1890s, the eagle had become a fixture in Victorian drawing rooms, where it adorned mantelpieces, sofas, looking glasses and grandfather clocks. Even now, thanks to its conspicuous presence on everything from cars and coins to beer bottles and bourbon advertisements, the bald eagle is probably more familiar to most people in the United States than any other bird.

A bald eagle—a real one—strikes the sort of heroic pose Americans have come to expect of national bird.



Tracing of a sketch by Pierre Du Simitière for seal contains elements that survived in final design.



The second committee's proposal introduced 13 stars and a shield with red and white stripes.

Unhappily, the eagle has not fared nearly as well in the wild. Just a decade ago, it seemed destined for extinction in the lower 48 states. But in this bicentennial year of the Great Seal, many state and federal biologists report that the species seems to be turning a corner. That comeback results partly from the eagle's own pluck and partly from public concern. Its status as a national symbol certainly helped.

In the beginning, ironically enough, the eagle wasn't even in the running. Franklin might have favored the turkey, but his colleagues on that first committee apparently weren't interested in animals. All three tinkered for weeks with elaborate allegories for the founding of the country, including the Children of Israel wandering in the wilderness. Consultant Pierre Eugène Du Simitière, a Swiss artist and designer, suggested a busy heraldic shield with the figure of Liberty on one side, an American soldier in buckskins on the other and the eye of Providence in a radiant triangle at the top. Underneath it all, Du Simitière unfurled a banner displaying the motto "E Pluribus Unum"—out of many, one. The final arrangement covered a lot of ground but was hopelessly cumbersome.

The second committee, too, omitted any wildlife in its design (above, right). It did, however, introduce several other promising elements, including an olive branch, a constellation of 13 stars and, in its first proposal, a bow and arrow. The third committee had enlisted the services of a 28-year-old Philadelphia lawyer named William Barton, apparently quite an expert on heraldry. Barton's rather stiff scheme had one redeeming feature: a small crested eagle with its wings outspread or "displayed" (opposite).

Thomson, a superb synthesizer, seized upon Barton's eagle idea and combined it with other devices plucked from the earlier proposals. Whereas Barton had used a European eagle, Thomson selected the bald because it was native to North America. And his bird was much more industrious than Barton's. In its beak, it grasped a banner bearing the slogan, "E Pluribus Unum." In the talons of its right foot, it held an olive branch; in the talons of its left, it held a quiver of arrows. On its breast, it bore a shield with red and white stripes in a chevron arrangement. When Thomson showed his sketch to Barton, the lawyer suggested a few revisions—he made the stripes on the shield vertical, and added a blue "chief" or rectangle above them to denote Congress—blue signifying, in his words, "Vigilance, Perseverance & Justice"—and the deed was done. Thomson himself was the initial "keeper" of the Seal, which was first used on a document authorizing General George Washington to negotiate a prisoner-exchange treaty with the British.

The original die of the Great Seal was cut soon after Congress adopted Thomson's and Barton's design. It and the press used to emboss the seal on official documents were first kept at the State House in Philadelphia, later the nation's first capital. Now on display at the National Archives in Washington, the 1782 die exhibits a disconcertingly scrawny bird whose expression seems to be one of amazement at the fix it is in. Six dies have followed, including the 1904 Zeitler die still in service, and the eagle's likeness has long since acquired a dignity and heft consistent with the serious purposes of the national imprimatur.

The Secretary of State is the official custodian of

One of William Barton's designs for third committee included for first time an eagle, wings extended.

Charles Thomson's design, primarily a synthesis, made the eagle the now-so-familiar central element.

the Seal, but the real "keeper" is Jane Mossellem, a soft-spoken executive in the State Department's presidential appointments office. She oversees the preparation and sealing of several thousand documents each year, including cabinet and ambassadorial appointments, treaties and other international agreements. Since 1961, the unusual screw-type press used to impress the die on paper wafers affixed to documents has been housed in an octagonal enclosure on public view in the State Department's exhibition hall.

The design of the Great Seal is the coat of arms of the United States and appears in some form on postage stamps, military insignia, official stationery, flags and passports. It adorns the doorways of America's embassies abroad, serves as the President's coat of arms and embellishes the dollar bill. From 1795 to 1933, the United States issued a $10 gold coin known as an eagle; a $20 gold piece (1849-1933) was called the double eagle. Both are now valuable collector's items.

Ben Franklin would have hated it. He detested the bald eagle and genuinely regretted its selection as the nation's symbol. "He is a Bird of bad moral Character," Franklin wrote years later to his daughter Sarah. "He does not get his living honestly. You may have seen him perch'd on some dead Tree near the River, where, too lazy to fish for himself, he watches the Labour of the Fishing Hawk; and when that diligent Bird has at length taken a Fish, and is bearing it to his Nest for the Support of his Mate and young Ones, the Bald Eagle pursues him & takes it from him. . . . He is generally poor and often very lousy. Besides he is a rank Coward. . . ."

Modern writers have inveighed against the bald eagle, too. In the *New York Times Magazine,* historian Richard B. Morris some years ago denounced the national symbol as "a gangster bird, a hijacker . . . a symbol of espionage . . . an image of frightfulness." What bothered Morris and a good many others was the eagle's historic appeal as a symbol of "imperial might, rapacity and brute power." The Persians and later the Romans carried it into battle on their standards. Emperors of Rome bore ivory scepters topped by golden and silver eagles. Charlemagne and Otto the Great flaunted the imperial-eagle emblem, and so did Napoleon Bonaparte.

But the eagle has been cherished for benign reasons, too. For the Greeks it was one of the symbols of Zeus. American Indians worshiped it for its beauty as well as its power. Eskimos carved eagles on their totem poles. The eagle was frequently reproduced on church lecterns to represent St. John the Evangelist.

Nowhere has the creature been more widely reproduced than in the United States. Franklin, Morris and other demurrers notwithstanding, American artists and artisans have carried on a long love affair with the bald eagle that shows no signs of simmering down. With its pugnacious expression and dramatic form, the bird was perfectly suited to the feisty patriotism of post-Revolutionary times. And because the emblematic eagle proved so hugely popular with the public, it became one of the country's dominant artistic themes. According to the art critic and collector Philip M.

A former Newsweek *and* National Wildlife *editor, Jim Doherty is a free-lance writer in rural Wisconsin. He has been watching bald eagles all his life.*

Diplomatic Reception Rooms, U.S. Department of State

Eagle-topped linen press, attributed to Michael Allison about 1803, is now at the State Department.

Isaacson, one of the earliest manifestations of bald eaglemania occurred at George Washington's first presidential inauguration in New York City. Washington's homely suit was set off by a fancy set of metal buttons displaying the eagle. Over the balcony at Federal Hall on Wall Street, where the swearing-in took place, hung an imposing reproduction of the Great Seal. At postinaugural celebrations, the eagle was much in evidence as a decoration and an embellishment on fans, clothing and handkerchiefs.

The eagle soared to the tops of the country's grandest buildings and the prows of its most majestic ships. The U.S. customs building in Salem, Massachusetts, the New Hampshire State House and the U.S. Bank building in Boston were surmounted by the national bird. The USS *Constitution* flaunted an emblematic eagle on its stern. The USS *Lancaster* had an eagle figurehead on its bow that was some 18 feet wide and weighed 3,200 pounds.

Three of the best-known carvers were William Rush, John H. Bellamy and Samuel McIntire. McIntire was a Salem housewright whose refined eagle decorations on mantels, over doorways and above roof ridges set a standard for New England homes that is still observed today. Rush, a cosmopolitan Philadelphian, produced a number of elegant eagles for buildings in the Quaker City that, according to Isaacson, stand as "small masterpieces of American sculpture." Bellamy, a sophisticated artist and sometime poet from Kittery Point, Maine, was perhaps the most prolific eagle carver of all, a meticulous artist whose gilded work is prominent in many distinguished collections of Americana today.

A theme becomes ubiquitous

Other patriotic craftsmen of the late 18th and early 19th centuries were bringing the eagle to life in other ways. Embroiderers, glassmakers, silversmiths, textile designers and foundrymen incorporated likenesses of the national emblem on quilts, goblets, plates, wallpaper, tapestries, toys, stoves and even baking molds. At the new American wing of the Metropolitan Museum in New York, many splendid examples of this eagle-ornamented work can be seen, including an exquisite tea service believed to have been done by Philadelphia silversmith Christian Wiltberger around 1800.

The eagle's impact on furniture was, if anything, even more profound. The bird was carved, inlaid and painted on Hepplewhite side chairs, Sheraton sofas and Chippendale secretary desks. It appeared on hardware and finials, wall clocks and mirrors, escutcheons and andirons. One of the nation's proudest treasuries of early American furniture graces the elegant Diplo-

In horizontal version of the Great Seal, bald eagle once adorned customs house in Salem, Massachusetts.

William Rush carved majestic bird in pine about 1810. It is at Pennsylvania Academy of the Fine Arts.

Eagle from Baltimore carved about 1795 tops cylinder-fall desk and bookcase now at Winterthur.

Watercolor rendering of figurehead on USS *Lancaster* by John Bellamy. Wingspread is 18 feet, 8 inches.

Gleaming screw-type press provides enough pressure to emboss the Great Seal onto official documents.

matic Reception Rooms of the State Department, and most of those pieces display the eagle motif. The collection is the work of Clement Conger, a veteran diplomat and native Virginian who is curator of both the State Department and the White House. An affable and amiably persuasive man, Conger—who wears eagle cuff links and an eagle tie clasp—built the collection from scratch by begging, borrowing and. only when absolutely necessary, buying.

Among the Department's priceless antiques is a circa 1803 linen press (p. 108) sporting no fewer than nine eagles—one carved on top, two inlaid on the doors and six cast in brass on the drawer pulls. There is a set of eight circa 1795 mahogany Hepplewhite chairs with eagles on the backs; each bird's head is turned to face a mate, so there are actually four matched pairs. In the James Madison State Dining Room, used by the Secretary for lunch with guests, the dining table is surrounded by 20 Sheraton chairs, each with an eagle on the crest rail thought to have been carved by none other than Samuel McIntire.

By the end of the 19th century, the eagle's hold on the public had become so secure the bird was being used as a synonym not only for patriotism but for boldness, excellence and all-around respectability as well. It marched to war on flags, materiel and recruiting posters. In politics, it was outnumbered only by mules and elephants. In business, eagles enlivened hundreds of trademark designs.

More recently, the eagle has played a prominent symbolic role in air and space exploration. Charles Lindbergh was dubbed "The Lone Eagle." The Apollo 11 spacecraft that first landed men on the moon was the *Eagle*. The first balloon to make a transatlantic crossing was called *Double Eagle II*.

These days, the eagle is the namesake of everything from tires, pencils and chili powder to carbon paper, men's shirts and neckwear, and a professional football team. In golf, an eagle is one stroke better than a birdie. A "bird" colonel, who wears a silver eagle insignia, outranks a lieutenant colonel. The "Eagle" rank is the highest a Boy Scout can achieve. And so it continues to go.

But in all these years that Americans have been extolling and exploiting their national bird, real bald eagles have been steadily losing ground. Now, there are only about 5,000 (with some 1,400 nesting pairs) in the lower 48 states. In all but five states the species is considered endangered; in those five it is threatened. Habitat destruction is a prime cause. By the late 1800s, logging and development had begun to make serious inroads on the tall trees and quiet isolation most eagles require.

There were other problems, too, from egg collecting to trapping and shooting, not only sanctioned but encouraged by law. Bounties were offered on bald eagles in Alaska as recently as three decades ago. Together with hawks, owls and other birds of prey, bald and golden eagles have traditionally aroused the wrath of farmers, ranchers, trappers and hunters who insist that raptors pose a serious threat to lambs, chickens, other livestock and game. State and federal laws now protect eagles, but several eagle massacres were exposed in Wyoming during the early 1970s. Every year, probably dozens of bald eagles are shot or otherwise done in.

Death at the top of the food chain

But nothing posed a more serious threat to the bald eagle's survival than a modern chemical compound called DDT. Around 1940, a retired Canadian banker named Charles L. Broley began keeping track of eagles nesting in Florida. Each breeding season, he climbed into more than 50 nests, counted the eaglets and put metal bands on their legs. In the late 1940s, a sudden drop-off in the number of young produced led him to conclude that 80 percent of his birds were sterile. Broley blamed DDT. Scientists later discovered that DDE, a breakdown product of DDT, causes not sterility, but a fatal thinning of eggshells among birds of prey. Applied on cropland all over the United States, the pesticide was running off into waterways where it concentrated in fish. The bald eagles ate the

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fish and the DDT impaired their ability to reproduce. They were not alone, of course. Ospreys and pelicans suffered similar setbacks.

But the tide began to turn. DDT was eventually banned and laws were passed to protect wildlife from other kinds of poisoning and persecution. Conservationists tried to establish how many eagles were left. The U.S. Forest Service and other agencies began to identify and protect eagles' nests on public land. Federal biologists tried "napping" healthy eggs from nests in relatively unpolluted parts of the upper Midwest and substituting them for polluted eggs in Maine. Some important nesting and wintering areas were shielded from development.

By now, there are signs these measures are paying off. In Wisconsin and Michigan, for example, eagle reproduction has improved significantly during the past decade. Nationwide, an annual survey by the National Wildlife Federation gives further encouragement to the hope that the species' long decline may be bottoming out. But habitat destruction remains a largely unresolved problem and for the past few years five teams of eagle experts have been working on recovery plans for different parts of the country.

The recovery efforts are handicapped by a lack of information. Bald eagles are complicated creatures and hard to generalize about. Their long lives and sheer scarcity make them difficult to study. Experts have long believed they mate for life but there are not enough data to be sure. They do know that eagles normally nest in tall trees and on rocky crags. Most raise their broods in spring and summer (though they do not necessarily reproduce every year). It has been estimated that only about 20 percent of the chicks will live long enough to reproduce. But nobody really knows. Southern birds tend to disperse to the North. In the winter, northern birds tend to migrate south, immature birds migrate farther than adults, and some adults don't migrate at all some years.

All bald eagles are not the same

An adult female weighs about ten to 12 pounds, has a six- or seven-foot wingspread and can fly only about 100 yards carrying a fish or mammal half its weight. The male is generally smaller than the female. Bald eagles favor a fish diet but will eat just about anything, from snakes and waterfowl to muskrats and carrion. They can be fierce and effective predators but they are also content to scavenge road kills and garbage dumps like a common crow. Young eagles usually start to fly between ten and 12 weeks, at which time they are usually adult size, but they do not acquire the distinctive white head, brown body and white tail until they are four or five years old.

Some eagles are shy and will not tolerate people; others seem undisturbed by motorboats and sightseers, and will nest cheek-by-jowl with vacation cabins. Bald eagles in the Aleutian Islands—which nest on the ground in the absence of trees—have been known to attack intruders at the nest, but eagles elsewhere generally do not. This timidity results not from "cowardice," as Franklin and others have anthropomorphically asserted, but to a sort of evolutionary prudence. "An eagle that is killed defending its nest obviously will not produce any more eagles," says Sergej Postupalsky, a wildlife biologist who has been studying Michigan's eagles for a number of years. "The bird's inclination is to do whatever will enhance its ability to produce more eagles."

Researchers are attempting to improve their understanding of what proportion of the total bald-eagle population is breeding, when young eagles start breeding, how long the birds are reproductive and how long they live. They want to know more about how much undisturbed land and water bald eagles require around their nests to raise a family (it varies, for example, from one habitat to another). The success of bald-eagle recovery plans depends in part on the quality of information.

But that the species can recover, given half the chance, now seems beyond doubt. On a cloudy evening last June, researchers Chuck Sindelar and Ron Eckstein started canoeing down the Bear River in northern Wisconsin near the tiny village of Manitowish. Soon they came to a stand of tall pine trees. Perched vigilantly on one of the highest branches was an adult bald eagle and next to it sprawled an enormous platform of sticks: nest number IR-14 on Sindelar's map. After donning his tree spikes, Eckstein clambered up to the fishy-smelling aerie, where he found two large eaglets nervously hissing at him. They were the ninth and tenth birds produced in that nest during the past seven years.

Quickly, Eckstein examined the youngsters and then affixed an aluminum ID band on the right leg of each. On the ground, Sindelar watched the parent bird circle the nest, shattering the silence with its shrill cries. After 200 years on the Great Seal, the American bald eagle is no mere symbol to conservationists like Sindelar and Eckstein. It is real.

Recovered from an injury, bald eagle looks to future. The species appears to be recovering as well.

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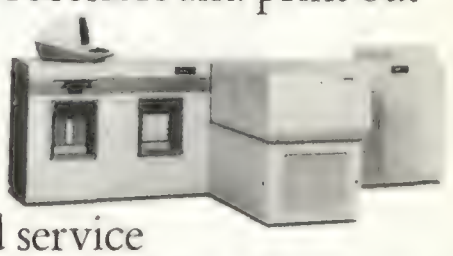

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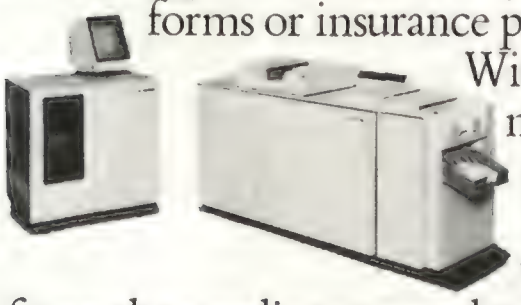

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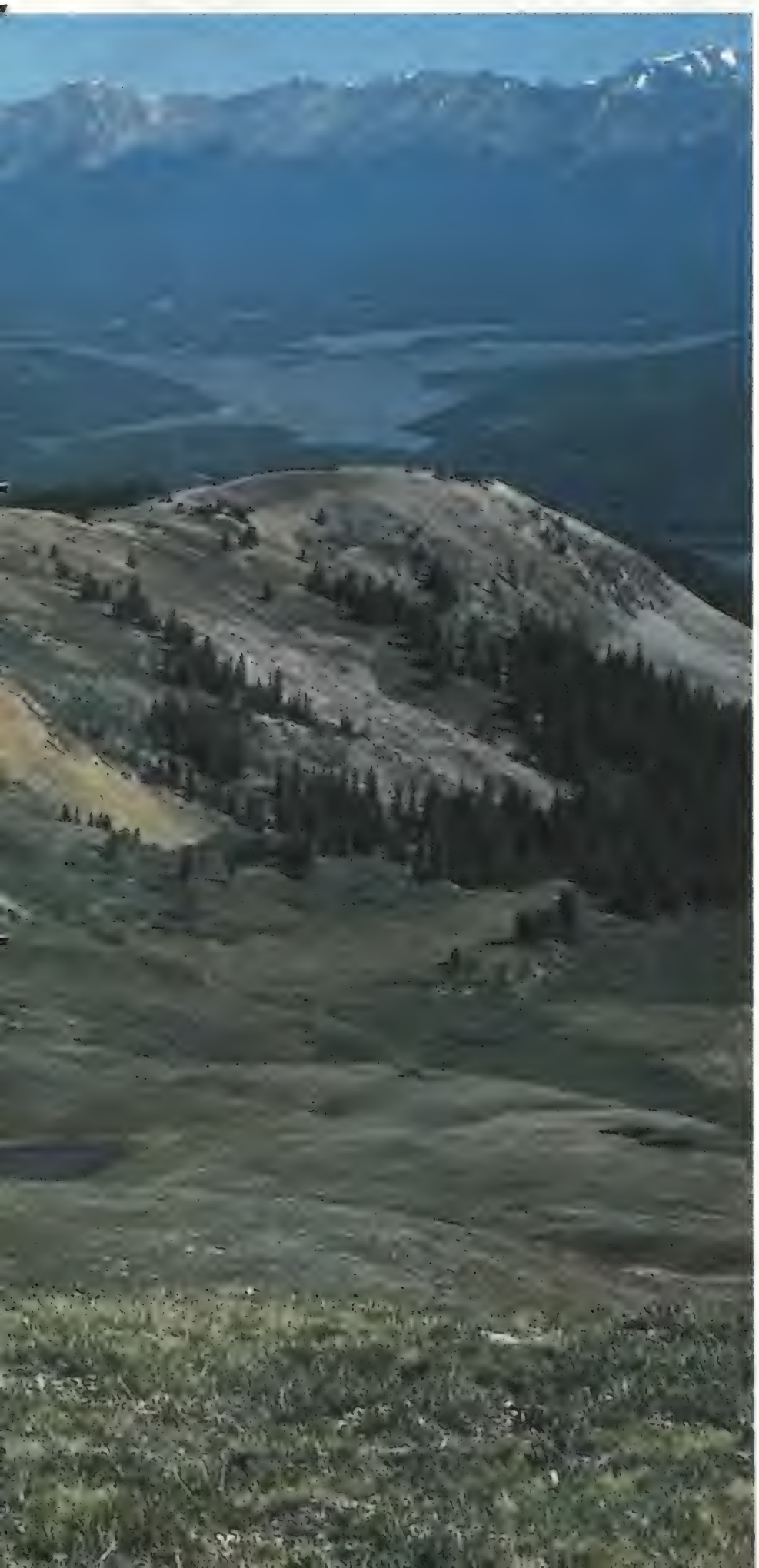
By Thomas A. Bass

All summer long in Gothic, Colorado, biologists are studying life at the top

The Rocky Mountain Biological Laboratory lies on a natural crossroads for animals, plants—and scientists—from many regions



The East River carves a neat boundary between the Elk and West Elk Mountains, a range located roughly between the towns of Aspen and Crested Butte, Colorado. Up the East River Valley at 9,500 feet sits the old silver-mining town of Gothic, all 207 acres and 52 buildings of which belong to the Rocky Mountain Biological Laboratory. RMBL is the country's foremost high-altitude biological field station—the most productive and physically one of the most beautiful.

Log cabins in various states of repair dot the townsite. A former saloon, with the aid of a buttress or two, still presides over the main and only street, while RMBL's three laboratories, also made of logs, sit unassumingly in a field of larkspur and blue flax. The most striking thing about the Rocky Mountain Biological Laboratory is simply where it is: a subalpine meadow on the western slope of the Rockies, watered and lush, that runs riot in the summer with a succession of wildflowers.

The Elk Mountains possess half a dozen peaks of more than 14,000 feet, and a geology that ranges from the brilliant sediment of the Maroon Bells in the north to the great igneous laccoliths of Gothic Mountain and Crested Butte in the south and west.

Successive waves of Ute Indians, Spanish conquistadors, French fur traders, U.S. military explorers, hardrock miners, cattlemen, campers and snowmobilers have wandered through the area, but seldom settled in it for long, which is why much of it is still pristine enough to be set aside as wilderness and national forest. RMBL has as its immediate "laboratory" the 1.7 million acres of the Gunnison National Forest, 175,000 acres of the Maroon Bells-Snowmass Wilderness Area, and another thousand acres of state and federal Research Natural Areas.

Each year as the snow melts off the road in late May or early June, 175 biologists of all persuasions arrive in Gothic with a homing instinct of their own. In three or four months the valley will be snowed in again by the customary 420 inches a year. The growing season is as brief as 51 days.

The list of past and present researchers includes many of the country's leading naturalists, population biologists and ecologists, but the visitor first arriving in Gothic might be hard pressed to figure out exactly what they do each summer up there in the Rockies. One can look behind the old saloon to see a few bits of colored string marking out quadrats in a meadow, or glimpse someone with a butterfly net jogging up the slopes of Gothic Mountain. But the real work of

Paul Ehrlich, a noted Stanford biologist,
adeptly nets butterflies on incline at 12,000 feet.

Photographs by Dennis Johns, David Sumner

the place remains unseen until one knocks on cabin doors or, better still, follows that butterfly net.

Paul Ehrlich and I push the Scout up the krummholz and lichen on Cumberland Pass, about an hour and a half southeast of Gothic. We park at 12,000 feet and walk to a nearby hilltop. It is a brilliant morning, with the Collegiate Range and Mt. Elbert, Colorado's highest peak, shining off to the north. Ehrlich is Bing Professor of Population Studies at Stanford, author of several popular as well as definitive works in ecology, and a lover of butterflies, which he has studied in the Elk Mountains for the past 20 years.

We are chasing *Euphydryas anicia,* a checkerspot butterfly that Ehrlich hopes to find newly aloft for the one brief month of its adult existence. "The males appear first and congregate on top of the hills," he explains, "where they wait for the females to come by. It's a strategy we might think of adopting," he adds.

Ehrlich is a gangly stalk of a man topped off by a gray beard and crystalline blue eyes. A bad back and weak knees give him only a precarious hold on the vertical, but he careens after the day's first specimen with the grace of an adept. He nets an *Oeneis melissa,* a member of the arctic group of hilltopping butterflies —not what we're looking for—but he stops to demonstrate the butterfly-marking system he developed back in 1960. Ehrlich and his students have worked on this ridge at high season to mark, release and recapture as many as 300 butterflies a day—a census that allows them to calculate the total population.

Ehrlich runs after the second catch of the day. A dozen swipes later, winded but obviously pleased, he pulls out of his net the first male checkerspot of the season. We admire it fluttering in his hand before it gets slipped into a glassine case and deposited in a Prince Albert tobacco can. It will later be frozen in liquid nitrogen and shipped to Cornell for a protein

Above, Mary Price, a student at Gothic ten years ago, pollinates scarlet *Gilia* for special research project.

Netted in the wild, rufous hummingbird is only temporarily passive as technician takes urine sample.

Mesh bags protect scarlet *Gilia* from hummingbirds and bees while researchers hand-pollinate field.

analysis that distinguishes the genetic structure of individuals in a population. The bulk of the morning's work, though, is to be more mundane.

Ehrlich has since disappeared over a rise, where I find him crawling up a boulder field on his hands and knees. He is looking under rocks for *Euphydryas* larvae, which he speculates take two or three years at this altitude before metamorphosing into pupae and, finally, adults. To test this and other aspects of butterfly reproduction, he is carrying larvae back to be bred in the laboratory.

"The larvae eat *Besseya alpina,*" he yells, pointing toward the purple spike of a flowering kittentail. "You find them by turning over rocks near the *Besseya,* and if you're lucky you come up with one every 20 minutes." I drop down on my knees for an applied lesson in butterfly collecting. "This is what we do," Ehrlich says, "come out here and roll rocks for hours on end. It's the sport of kings."

Today's outing is a good example of why in the first place anyone would study high-altitude biology. Natural habitats are not that easy to come by, and this one, Ehrlich claims, "is arguably the richest spot in the country for butterflies." The Gunnison Basin, with the Elk Mountains to the north and the San Juans to the south, is a biological crossroads. Converging here are the flora and fauna found in the Central Plains, the far North, the Great Basin, and the desert Southwest.

There is also the remarkable fact of the area's altitudinal "zones," that a climb 1,000 feet up gives you the equivalent in climate and vegetation of a journey 600 miles to the north. Flowering times are also staggered altitudinally, so that if you miss the first montane glacier lily opening in May, you can walk uphill to find it blooming as late as August. Above 11,500 feet lies the alpine zone of krummholz and lichen, while every thousand feet down from there you drop through a biological layer cake of Douglas fir, Engelmann spruce, Lodgepole pine, aspen, scrub oak and mountain mahogany, before finally coming out onto mesas of juniper and piñon pine.

We have two larvae to show for an hour's rock turning. Not bad. Ehrlich then collects a bag of *Besseya* to feed them back in Gothic. We are perched on a 45-degree incline, but he can't resist chasing a few more butterflies. On the way to the car we stop for a moment and look out over the Continental Divide. "I love it here," he says. "I've been a lot of places in the world and this is the one I keep coming back to."

Life at RMBL ranges from the primitive to the not-

Author Thomas Bass is a free-lance writer who lives in New York. He is currently writing a book about computers and gambling.

Abbie and Robert Enders check trapline. He has been running small-mammal census in area since 1956.

so-primitive. Some of the cabins have a good view of the mountains—right through the cracks in the wall—while others are a bit more sumptuous. Electricity reached Gothic in the 1950s. The first indoor plumbing came a decade later, but is still less in evidence than the town's wooden outhouses. A telephone has yet to arrive and, until the installation of a radiophone last year, the only way to reach someone at RMBL was to leave a message at Tony Mihelich's hardware store in Crested Butte—and wait a day.

RMBL is a private field station affiliated with no universities or museums, and as such has to support itself out of good will, donated labor, dues from its 300 members, fees for cabins and research cubicles, and support from whatever other sources it can solicit.

"We don't have a parent institution," says Peter Brussard, director of the Laboratory, "so we're a little equipment-poor. But field biology and ecology have evolved to the point where they are asking fairly sophisticated questions. Although we're still grounded in the field, we need the research facilities without which you can't do modern science."

A miserly budget of $100,000

Arrangements for living and working at RMBL include an array of individual and ad hoc agreements. There are leaseholders who have built cabins on RMBL land and have had "first use" of them for 20 years; there are renters of cabins who, in exchange for fixing them up, enjoy rent stabilization; some researchers are supported by universities, others by grants, and others out of their own pocket. But the Laboratory somehow manages yearly to scrape together its miserly budget of $100,000.

RMBL also has what looks to an outsider like a medieval system of scientific fiefs and allegiances. A "principal investigator" might arrive with his own grant monies and an entourage of equipment, research associates, graduate students, technicians, undergraduates and family members, all of whom he pays to house and feed. Other scientists arrive solo or with immediate family, and then there are 25 students who come to RMBL to take the seven-week, accredited courses it offers in botany, mammalogy, aquatic biology and field ecology.

Much of the season's work depends on weather, flowering times, animal behavior and plain old accident. Last year, for instance, bees foraged for nectar on scarlet *Gilia*. The biological truism declares that bees only forage on blue-flowered plants, while red flowers are reserved for hummingbirds. But it took 30 seconds standing in a patch of scarlet *Gilia* to see bees happily feeding away. Nick Waser and Mary Price, assistant professors at the University of California at

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As she cools her right foot after a bee sting, Bobbi Peckarsky studies aquatic insects in observation box.

Riverside, decided to find out why. They already had a half dozen projects under way but this one got undertaken along with the others. My own field notes on their research schedule show days that look like this:

- 6:30 Wake up. Light stove and hope there is enough wood chopped from the day before. After several years of "home improvements," Waser and Price's cabin now has a sleeping loft (to keep the mice from scurrying over them at night), running water (cold), and a window looking out over the East River. The outhouse is up the hill.
- 7-8 "We shake ourselves awake, cook breakfast, sit on the front steps, and otherwise contemplate the day," says Price.
- 8:30-12 Hand-pollinate fields of larkspur and *Gilia.* A meticulous job involving toothpicks and the carrying of pollen from plant to plant.
- 12 Lunch.
- 1-5 Behaviorial observations in greenhouse. Make movies of bees and hummingbirds foraging on larkspur. Collect and count seed sets from hand-pollinated plants that have matured. Do a frame-by-frame analysis of greenhouse movies. Dust fluorescent powder on flower anthers in the field. Later—use microscope to measure pollen dispersal by foraging hummingbirds and bees. Measure nectar production in the scarlet *Gilia.* Observe bees breaking all the rules by feeding on them.
- 6 Take a dip in river. Chop wood. Fire up the stove. Cook dinner.
- 8-10 Keep daily log. Analyze data. Write and revise papers. Attend RMBL seminars. Read spy novels.

Even a day off in Gothic looks strenuous. July 4, for instance, features a marathon followed by a parade up and down Elk Avenue. Then comes an RMBL barbecue and country dancing in the streets of Crested Butte. It is a brief season up here in the Elk Range. You have to move fast, or you'll be snowed in again before you know it.

Gothic began as a mining town

The Laboratory got started back in 1930, when an enterprising Swede by the name of John C. Johnson bought the town of Gothic for $200 in back taxes. The 22-room Olds Hotel was thrown in for an extra three dollars. Two years earlier, while a professor of biology at Western State Normal School in nearby Gunnison, Johnson and a handful of colleagues had leased the Olds Hotel, swept out the dust and opened the first season of the Rocky Mountain Biological Laboratory.

Gothic had once been a thriving town of 5,000 people with two hotels, two dance halls and many more saloons. In 1880 word leaked of large finds of high-grade silver ore and there began what the papers described as "a wild stampede" of miners to Gothic.

The silver deposits never proved as rich as hoped for, and Gothic began almost immediately its slide back into quiescence. The town was "pretty well dead" by the Panic of 1893.

Photographs of Johnson back in the early years of RMBL show a sober man dressed in coat and tie, usually with a burro and water bucket. For the 30 years of his tenure as founder and director of the Laboratory, he ran it out of pocket.

Biology back then consisted of the old "ologies"—mammalogy, ornithology, herpetology and so on. One worked on taxonomies and herbariums. You learned in biology classes how to shoot, trap and stuff, and there was initially the brute task of merely cataloguing everything that swam, walked, grew and flew in habitats from the Arctic down to the upper Sonoran.

More recently, however, the "new" sciences of ecology and population biology—sciences concerned with the interaction of organisms, how their populations fluctuate, and why they look and act the way they do —have arrived in Gothic. This is often sophisticated research using laboratory experimentation and computers, but it is at the same time research based on the study of natural populations.

There is excited hope in Gothic these days that RMBL, with a new laboratory (funded by the National Science Foundation) and continued patronage from some of the country's best scientists, could find itself projected to the forefront of evolutionary and ecological research, while at the same time maintaining itself fundamentally as a field station.

Every morning during the ten weeks of his field

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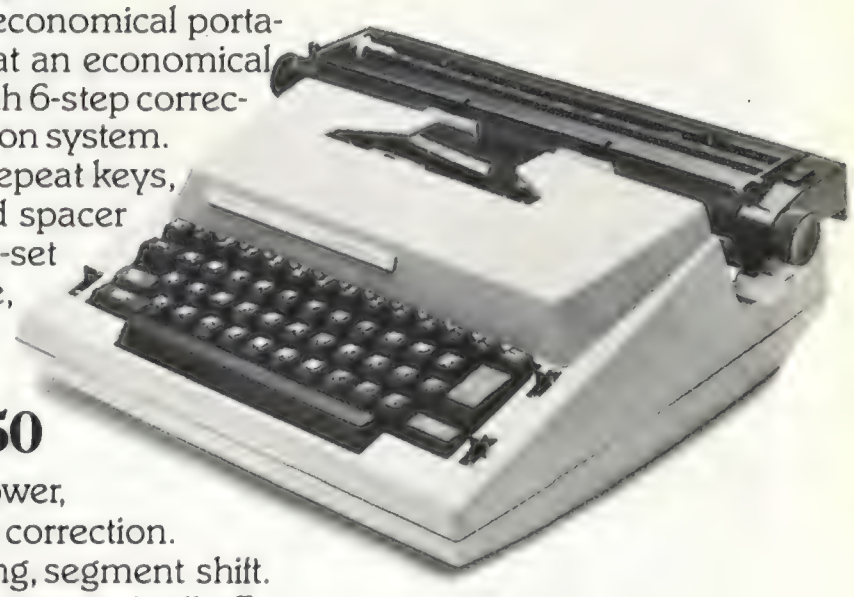

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RMBL director Peter Brussard casts a plankton net to collect *Daphnia* from pond to study acid rain effects.

season, Ken Armitage parks up the East River Valley with a spotting scope hung out the window of his Land Cruiser. He is observing one of the half-dozen marmot colonies he has had in view for the past 20 years. Marmots are sociable animals. They live in colonies burrowed into rock fields, hibernate in the winter, and then emerge in the spring to forage, play, fight, bask, mate and regroup into new colonies. Every one of these interchanges gets recorded in the notebook sitting in Armitage's lap.

I drive up the East River one morning to join Ken Armitage. There is just then a flurry of activity up on the talus. Several warning pips, a chase, more pips, a lot of running in and out of burrows. With things quieted down, Armitage steps out to say hello. He is a substantial man who at 56 is still fit enough to run the eight-and-a-half-mile Fourth of July marathon in 76 minutes. "We have to move fast," he says. "I've got some animals in traps down the road, and it's getting pretty hot by now." We drive down to a clearing that goes by the name of Marmot Meadow.

Walking up to the burrows we discover eight animals caught in six traps. They have already been trapped once this year, dyed on the back, weighed, measured, tagged in both ears and run through laboratory experiments. Today they will be weighed and measured again. In the first trap we find Stripe Blot, a yearling. Over the mouth of the trap, Armitage holds a canvas bag. A long funnel with the narrow end zippered shut, it is supposed to look as inviting as a burrow. Armitage gets on his hands and knees, taps the cage, blows on the animal's fur, talks to it. "You're not going to give the master a hard time, are you?"

He works his way through the cages, bagging, weighing, tagging, measuring Triple Stripe, Blot Back and, finally, Blot Rump, who manages to get a nice bite on the master's middle finger. "The first time in 20 years," he jokes.

As we stand looking up the valley, Armitage begins to wax eloquent on marmot *agon* and *amor*. How the dominant male defends his territory, which consists of several females and their young, until these are big enough to be chased off into the hills, where they die or establish colonies of their own or wait to come back and vanquish the father. "It could make an episode of *Dallas* look pale by comparison," he says.

In a later conversation Ken Armitage points out to me the two heliports on Bellevue Mountain, which are used to ferry in exploratory mining rigs. They are a mere three miles up the road from Gothic and not far from his study sites. In 1977 the Climax Molybdenum Division of AMAX announced a major strike on Mt. Emmons, a peak directly behind the town of Crested Butte. This is the third largest deposit in the world, says AMAX, 130 million tons of ore-grade molybdenum, which they intend to extract in a billion-dollar mining operation that would hollow out Mt. Emmons and probably double the population of Gunnison County in the next 15 years. The decision by AMAX to go ahead with the mining operation has been postponed for two years but there is still concern for the future survival of RMBL.

Co-existing with the mines

Peter Brussard (left) associate professor in ecology at Cornell, has been director of RMBL for the past four years. He is a former student of Ehrlich's, an outspoken Nevadan who at age 43 switched from butterflies to aquatic systems. "I think the Lab can co-exist with the mining interests in the area. We have to be adaptable, be willing to try new things and go off in new directions. We have the largest concentration of environmental expertise on the Western Slope, perhaps in the state of Colorado, and I'd like to see the mining companies make use of us. They are not going to go away; so what the Lab has to provide is accurate information on the ecological effects taking place at high altitude."

In 1980 John Harte, a researcher at RMBL, discovered the first signs of acid rain and snow falling on the western slope of the Rockies. Harte, a theoretical ecologist at the Lawrence Berkeley Laboratory of the University of California, has spent a lot of time out in the field lately looking at acid rain. The discoveries he made two years ago up in Mexican Cut are serious enough to have engaged a half-dozen other scientists in a coordinated project.

Mexican Cut is a unique parcel of 420 acres owned by the Nature Conservancy and administered by RMBL. It was recently designated Colorado's first State Research Natural Area. The Cut consists of a series of glacial tarns and benches stepping down from Galena Lake at 12,050 feet. In its hanging valleys lies a string of 17 interconnected ponds, the lowest of them at 11,000 feet. Rich in a diversity of zooplankton and axolotl salamanders, they are an aquatic biologist's dream—a natural altitudinal gradient with the diversity of species increasing from pond to pond as one drops lower in the Cut.

Reached by an hour's hike up through stands of spruce and fir, the area remains virtually pristine, except for the acidity of the rain and snow falling on it. Harte and his field assistants have set up a chemistry laboratory in an old mining cabin at one of the ponds, where they have settled in to watch the long-term effects of industrialism. Acidity, from the 10,000 megawatts of coal-fired power generation in the Great Basin, from Los Angeles and from all industrial sources in the northern hemisphere, is slowly altering what was once thought to be one of the last wild places in America.

"High-altitude lakes are like canaries in a mine or lymph nodes in a body," says Harte. "They concentrate poisons and give us an early warning of dangers to come."

The group of scientists working alongside Harte includes Peter Brussard, who is looking in the ponds for an acid-resistant strain of *Daphnia,* and Barbara Peckarsky (p. 122), a stream biologist in charge of monitoring outflow from the Cut.

Bobbi Peckarsky was a high-school science teacher

Affectionately called Master Marmot by his students, Ken Armitage checks ear tags of bagged marmots.

in Wisconsin when she first came to RMBL to take a summer course in aquatic biology. That summer turned her into a stream biologist and sent her back to finish a PhD at the University of Wisconsin. She now teaches at Cornell.

Peckarsky specializes in the ecology of stream insects, especially mayflies and the stoneflies that eat them. The presence or absence of these insects in a stream also happens to be a sensitive gauge of physical and chemical changes in water quality. "My work has some practical applications," she says, "but the primary reason I do what I do is that I love it."

Peckarsky is naturally effervescent. An accomplished scientist and raconteur, she can be found most days down on the banks of or *in* the East River, where she refers to herself as a "kicker and picker," because a good part of stream ecology involves the kicking up of the substrate in order to collect the insects newly loosed from the bottom.

I join her one day and watch her work. She scoops up insects and places them in a Plexiglas observation box. She is trying to figure out what kind of cues—tactile, visual or chemical—govern their interaction. Everything is timed, noted, controlled and repeated. I have seen the same concern for detail out grubbing for *Euphydryas* larvae with Paul Ehrlich, counting zooplankton with Peter Brussard, hand-pollinating plants with Nick Waser and Mary Price, observing marmots with Ken Armitage.

"We took a look at our bibliography a couple of years ago," says Pete Brussard, "and were surprised to find 300 publications and 40 M.A. and PhD dissertations, and the number is going up exponentially every decade. But beyond its official presence, I ask myself from time to time, what is it that characterizes the spirit of the place?"

"Half the people I care about in the world are up here," one researcher tells me. Another mentions the intense, almost spiritual interaction that goes on in Gothic. "It's like a summer affair. You get deeply involved and go away enriched by the experience."

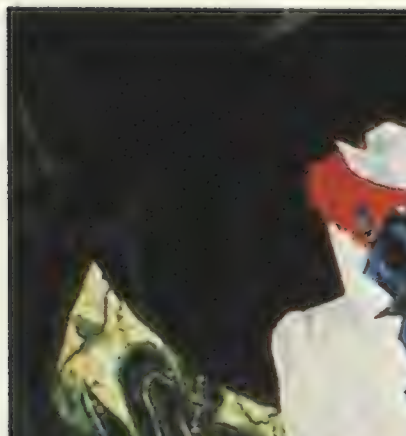
Someone else remarks that "talk is the main amusement here, although I often sit and stare at the mountains." Over cocktails, dinner and into the evenings, the talk in Gothic is mostly about science and other experiences in the field. One evening the discussion turns to reef diving, ichthyology, getting the bends. This is followed by a long digression on the best technique for marking cichlid fishes in Lake Malawi.

I sit in a meadow at Copper Lake one afternoon watching Svata Louda examine the distribution of mustard plants in relation to the herbivores that eat them. Above us stretches the red talus of West Maroon Pass, while all around us is a meadow blooming with glacier lilies, marsh marigolds, king's crown, and the bittercress and candytuft that Louda is studying. She works along a small stream that runs from the snowfields into the lake. She is down on her hands and knees in a quadrat of bittercress, measuring the leaves and the number of holes chewed in them by beetles.

A young man with a pack on his back walks across the meadow. He sees Louda kneeling and says to her, "It's a strange time of day to be praying." She laughs and tries to explain that she is not praying, but out in the field doing science.

July 4 parade down Elk Avenue, Crested Butte, features RMBL majorettes with butterfly-net batons.

Double rainbow rises over Gothic where new RMBL buildings contrast with the Old Town Hall (right).



AREA 1:
Sculptor Michael Singer. Site work at right is his *First Gate Ritual Series 4/79.*

AREA 5:
Douglas Bourgeois and his painting *George Febres and the Jungle Nurses.*

By Randy Sue Coburn

Raising the veil on emerging artists across the country

A private foundation, a government agency and a business get together to help find and recognize the young and the talented

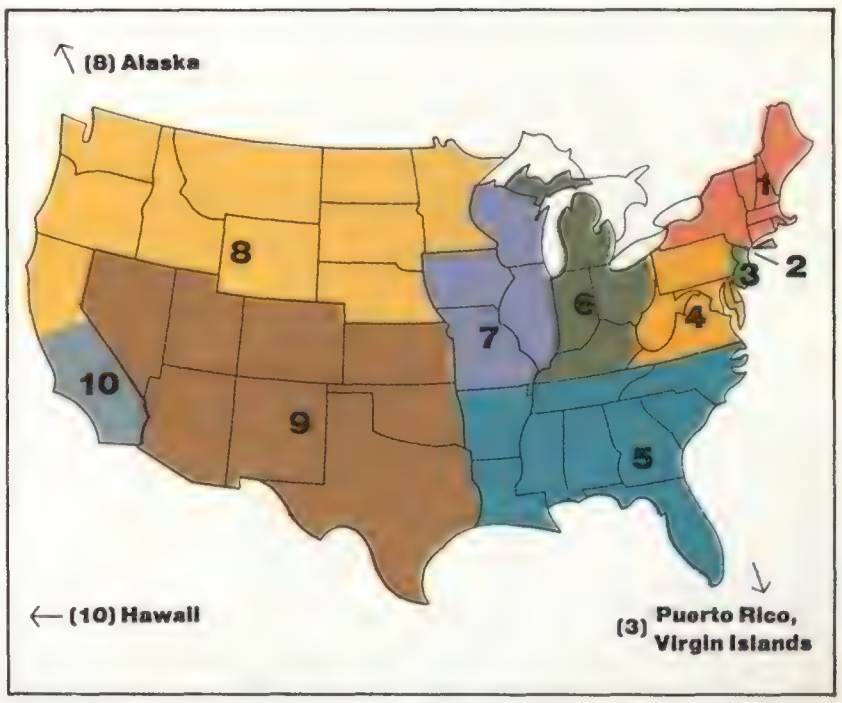
Among artists, there is hardly an issue touchier than the processes by which the "emergent" among them are identified, whether it be by fellowships, biennials or critical attention. Definitions overlap, contradict and, more than anything, annoy. A viable contender for second place on the sensitivity scale is "regionalism," a word guaranteed to cross the rather low suspicion threshold of artists, directors and curators anywhere, but especially outside New York, where the term can fairly smack of condescension.

It is not difficult, then, to understand the chaos that ensued several years ago when Ted Potter, director of the Southeastern Center for Contemporary Art (SECCA), an outstanding regional institution, invited about 16 of his professional peers to gather at the Whitney Museum in New York. In the course of a two-day meeting, they were to discuss his ideas for a nationwide regional-arts-award program. It would, as it turned out, take much more time than that to defuse such explosive identifying terms. Potter's blueprint was SECCA's own program, which annually awards seven Southeastern artists with a $2,000 fellowship, an exhibit in SECCA's Winston-Salem, North Carolina, galleries (SMITHSONIAN, January 1979) and a quality catalog. Various regions of the country, he suggested, might be interested in a similar activity. The Rockefeller Foundation and the National Endowment for the Arts, both of which helped support SECCA, were represented at the Whitney meeting, where there was, as Potter recalls, "an almost unanimous lack of interest." Howard Klein, the Rockefeller Foundation's director for arts, co-chaired the gathering, which he brought to an end just after lunch on the first day because, he says, it just wasn't working.

At any rate, Potter was able to enlist the enthusiasms of Klein and Harry Rand, whose boss at the Smithsonian's National Museum of American Art in Washington, the late Joshua C. Taylor, encouraged pursuit. Since it proved impossible to clone SECCA's plan, the idea became something else. It became the Awards in the Visual Arts (AVA) program, which last fall designated ten "threshold" artists from ten different areas of the country to receive generous awards of $15,000 each and participate in a national touring exhibition designed to elicit major critical attention, a boon these artists were deemed to lack but deserve. When this new approach was presented for NEA approval, there was, Klein says, "a hard core to bang on."

This month, the first AVA show opens at the National Museum of American Art with a catalog dedicated to the memory of Joshua Taylor, a man who elegantly articulated and regularly demonstrated the idea behind AVA: that there are artists worthy of support and recognition in every part of the country. "We are especially interested in this program," Taylor wrote, "because it brings us in closer contact with artists throughout the country. . . . That it will bring the artist both local and national recognition is of particular significance in strengthening the broad basis of support for the American artist."

In November, the show will go to the Des Moines Art Center and in February, the Denver Art Museum. Each of the exhibiting museums will be provided with $5,000 to purchase pieces from the show, or other



Map identifies ten areas of the country, each with ten nominators and one juror, who chose artists.

works by the participants, to add to its collections.

For the artists chosen, the exhibitions, catalog and purchase money are among the most innovative AVA features, ones that set it apart from and extend NEA's traditional program of individual grants to artists. For the structure and future of arts funding—particularly in light of the current economic situation—what is equally significant is the combined approach for support implemented by AVA, which brings together a government agency (NEA), a private foundation (Rockefeller) and a business (the Equitable Life Assurance Society of the United States).

The author wrote most recently in the January 1982 SMITHSONIAN *on illustrator-writer Maurice Sendak.*

As AVA became a more selective program, the selection process itself became an elaborate construction of nominations and double blinds designed in the interest of fairness and participation. Prominent people were enlisted to help choose 100 nominators (ten from each area) and ten jurors (one from each area). As a further safeguard, two "national" jurors were selected: sculptor George Segal and John H. Neff, director of the Museum of Contemporary Art in Chicago.

Built into the effort are attempts to answer the most common criticisms of programs that give money to artists, as well as of the biennials that some believe have abdicated the job of presenting a broadly based survey of the "emergent" artists in favor of

AREA 8:
Marsha Burns,
photographer, and
#45170, black-and-white
silver-gelatin print.

AREA 3:
Edward Flood.
Amanita II (Maze)
is in two units of paint
on mixed materials.

narrower, more personal curatorial visions. Among this year's recipients, most of whom are in their mid-to-late thirties, perhaps those best known to the art community are Ed Flood, Michael Singer (SMITHSONIAN, January 1978) and Terry Allen. A 39-year-old recipient of two NEA grants and a Whitney veteran, Allen figures he's been "emerging" for "right around 20 years," with his work taking the form of drawings, prints, sculpture, video tapes and songs commenting vividly on life and art in America.

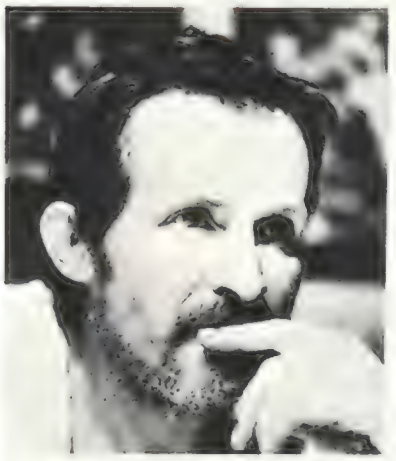
The video tape Allen submitted for AVA is a highly personal treatment of antagonism between the sexes set in a wrestling ring. More applicable to the subject at hand, though, is Allen's "Truckload of Art," a country-style song written in 1968 that pokes fun at the New York art axis which, as the introduction has it, "started feeling real superior to their ego-counter-parts out on the West Coast." So they filled up a truck with "hot avant garde" and sent it West, only to have the truck crash in flames somewhere in America.

As for the future, both the Rockefeller Foundation and the Equitable Life Assurance Society are committed to AVA through 1982. Already there are signs that AVA aims for a wider scope: Ted Potter predicts that AVA's computer and slide library will become a national resource and hopes that the exhibit might be sent abroad. It will be a considerable enough accomplishment, though, if AVA satisfies artists around the country as an equitable, intelligently administered program created in their interests.

AREA 2:
Richard Bosman.
His canvas is titled
Night Fall, was
completed in 1981.

AREA 7:
Stephen Schultz.
Untitled (diptych),
71 by 108 inches,
is dated 1981.

AREA 4:
Maurie Kerrigan. Work is *Flaming Mallard Confrontation*. Wood, fresco, papier-mâché.



AREA 6:
Michael Luchs. *Untitled #7*, left, is made of wood, metal, cardboard, paint. Dated January 1979.

AREA 10:
Terry Allen and video tape, which he calls *The Embrace... Advanced to Fury*.

AREA 9:
Richard Shaffer. His *Self-portrait in Doorway,* 43 by 37 inches, was completed in 1979.

By Theodore James jr.

World went mad when mighty Jumbo came to America

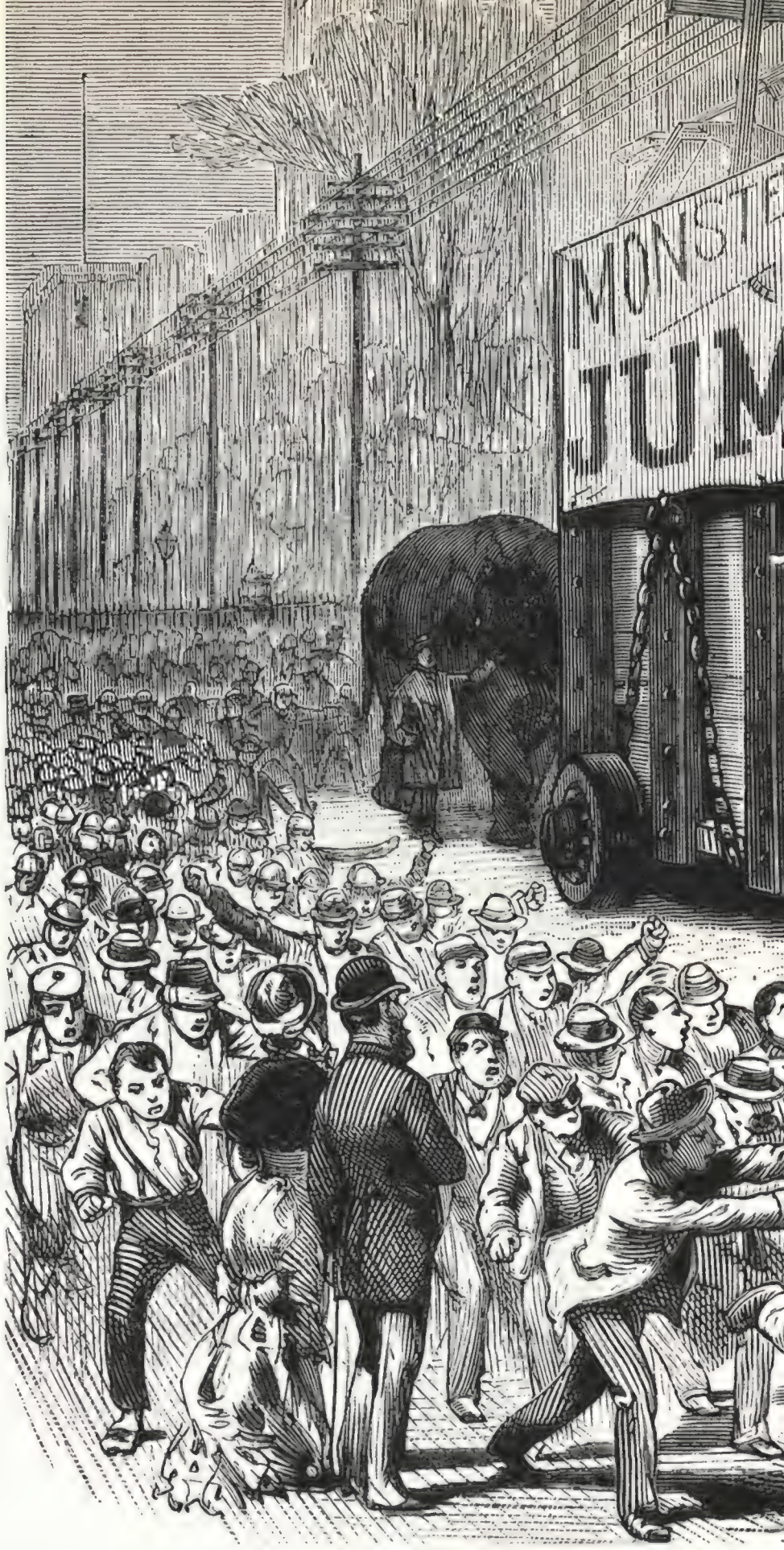
Tears flowed in London and cheers rose in New York as the noblest elephant of them all heeded the call of Mr. Barnum

The year was 1880. America was entering the "Elegant Eighties" with optimism. Vast fortunes had been made in the West and people like the Vanderbilts, Andrew Carnegie, Jay Gould, Henry Clay Frick and the Astors were now to be reckoned with seriously. The first telephone and the first electric light had appeared. And for diversion, year in and year out, millions of Americans, rich and poor alike, flocked to see Phineas Taylor Barnum's great traveling circus.

But Barnum's show was in trouble. Competition from James A. Bailey's "London Circus" was seriously cutting into his profits. And so the shrewd impresario, now in his seventieth year, approached Bailey and offered him and his friend James L. Hutchinson half of the profits of a joint venture. The Barnum and Bailey circus was born.

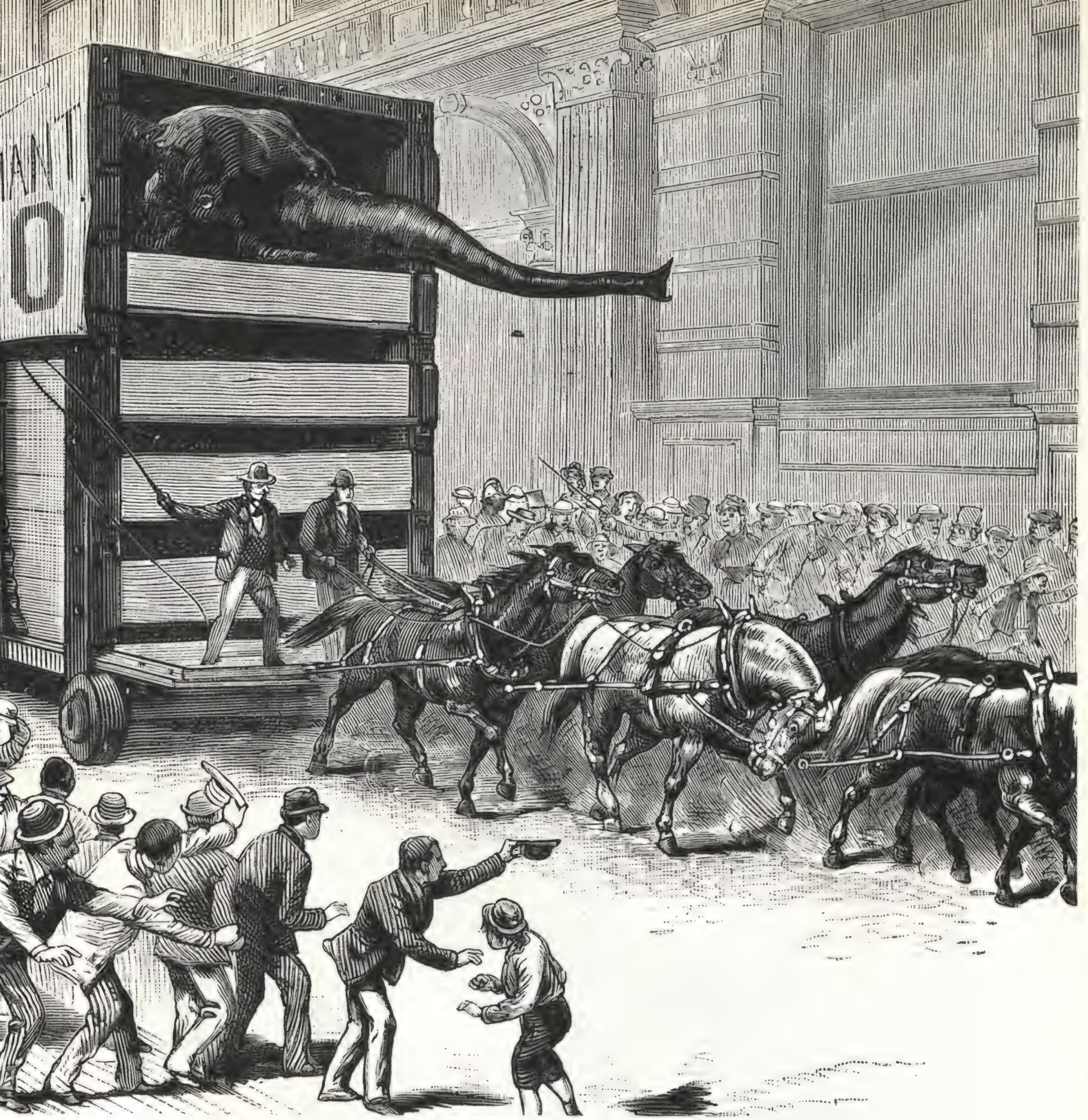
Having merged "The Greatest Show on Earth" with the "London Circus," Barnum wanted to acquire a spectacular attraction to maintain a "bigger and better" image. In 1881, he presented to his public a pair of giraffes, one Nubian buffalo, 14 camels, a "dwarf zebra bull," five African leopards, an array of exotic birds. However, these were hardly worthy of the man who had brought Americans the "Swedish nightingale," Jenny Lind, and the fabled midget, Tom Thumb, and his wife Lavinia.

Mr. James described Tom Thumb's wedding in the September 1973 issue. E.P. Dutton will publish his book, The Epicurean Vegetable Garden, *next year.*



Contemporary drawing shows a spontaneous parade flanking Jumbo on way to Madison Square Garden.

There was one attraction in all the world that would very likely assure Barnum's supremacy in the circus business: Jumbo the elephant, largest pachyderm in captivity. Born in Africa, he was captured and sold to the zoo in Paris. In 1865, London's Zoological Gardens acquired him in exchange for a rhinoceros. He was then about five feet tall. Over the years he eventually grew to an astounding height—about 12 feet. (Jumbo still ranks as one of the largest known



specimens of the African bush elephant. The more recent example in the rotunda of the Smithsonian's Museum of Natural History is more than a foot taller and probably about a ton heavier.)

In his memoirs, *Struggles and Triumphs,* Barnum wrote, "I had often looked wistfully on Jumbo, but with no hope of ever getting possession of him, as I knew him to be a great favorite of Queen Victoria, whose children and grandchildren are among the tens of thousands of British juveniles whom Jumbo has carried on his back. I did not suppose he would ever be sold."

But in the summer and autumn of 1881, Barnum's agents were traveling in Europe in search of novelties for the circus. According to Barnum's own account, when one of his agents arrived at the London Zoo, he was "so struck" by the enormous size of the "majestic Jumbo" that, half in jest, he asked the superintendent

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if he would sell him. The startled man, noted Barnum, "replied rather sarcastically in the negative."

Barnum's agent pursued the question: Barnum, he said, would pay handsomely. A price of £2,000 was mentioned. After all, the London Zoo was aware that if the giant elephant went wild, he would cause terrible damage. A cable sped to New York. Next day another Barnum agent, a Mr. Davis, left for London with a bank draft for the equivalent of $10,000.

Had the London Zoo anticipated the ensuing clamor in the British Isles, it undoubtedly never would have sold the elephant. From the *Times* down, according to Barnum, the press "daily thundered anathemas against the sale." Quotes from "statesmen, noblemen and persons of distinction" urged that the deal be called off. Many were angry that newly rich, upstart America should be raiding the treasures of the "mother country." Promises were made that any damages which might

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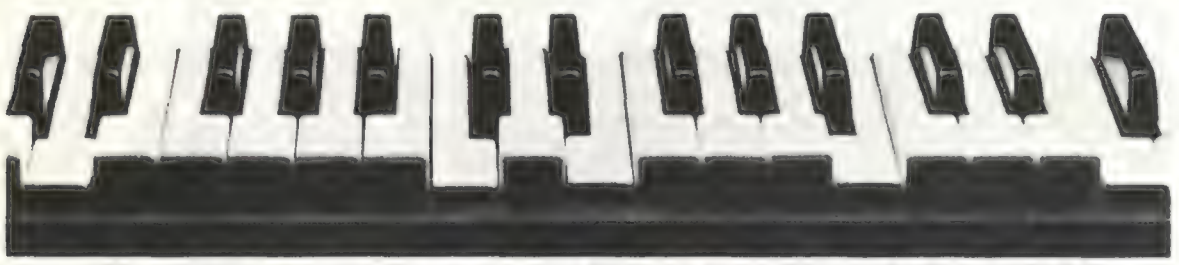

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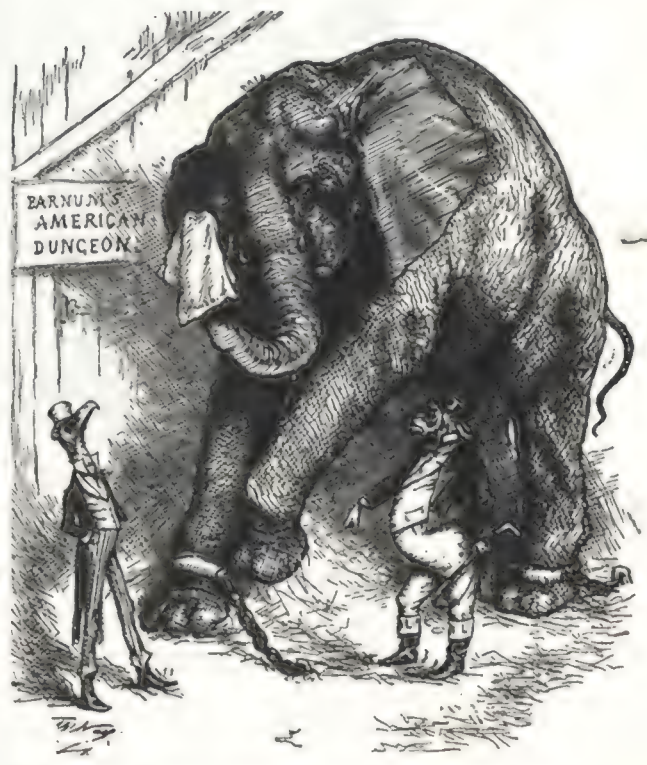
be awarded to Barnum by the British courts would be paid by the public. Thousands of children who had ridden on the benevolent elephant's back begged Barnum not to take away their friend.

Even Queen Victoria reportedly telegraphed the zoo's superintendent for details about the sale and urged cancellation of the bargain; and the Prince of Wales apparently summoned him to Marlborough House to discuss the transaction.

"No more quiet garden strolls, no shady trees, green lawns, and flowery thickets," lamented London's *Daily Telegraph*. "Our amiable monster must dwell in a tent, take part in the routine of a circus, and, instead of his by-gone friendly trots with British girls and boys, and perpetual luncheon on buns and oranges, must amuse a Yankee mob, and put up with peanuts and waffles."

All the hoopla in London created a reaction in the United States. American newspapers urged Barnum to stick to his guns and go through with the arrangement. No less a distinguished periodical than the *New York Times* ran daily front-page articles about the controversy. Rum-



Thomas Nast shows British lion seeking Jumbo's release from American eagle.

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Colorful advertising cards like this played with the theme of Jumbo's journey to America.

blings of war in Europe seemed minor compared to news of Jumbo.

One day the British editor of the *Daily Telegraph* cabled Barnum asking him to name a price for which he would cancel the sale. Barnum cabled back: "MY COMPLIMENTS TO EDITOR 'DAILY TELEGRAPH' AND BRITISH NATION. FIFTY-ONE MILLIONS OF AMERICAN CITIZENS ANXIOUSLY AWAITING JUMBO'S ARRIVAL. MY FORTY YEARS' INVARIABLE PRACTICE OF EXHIBITING THE BEST THAT MONEY COULD PROCURE MAKES JUMBO'S PRESENCE HERE IMPERATIVE. HUNDRED THOUSAND POUNDS WOULD BE NO INDUCEMENT TO CANCEL PURCHASE. . . . P. T. BARNUM."

In a last-ditch attempt to prevent the sale, one of the Fellows of the Zoological Society filed an injunction in the Chancery Court to block the purchase. In the end, the motion was denied. The sale was declared valid and Jumbo belonged to the American impresario.

With the finalization of the sale, all London swarmed to the zoo. As many as 10,000 persons in a single day came to take a final look at Jumbo. One food stand reported more than 4,000 buns sold in one day, all purchased by spectators and fed to the elephant.

Jumbomania consumed London. In shops and on the streets, Jumbo bracelets, Jumbo canes, Jumbo bangles, Jumbo beefsteaks, Jumbo cigars, Jumbo fans, Jumbo earrings and tins of Jumbo soup were sold by the thousands. *Jumbo's March* was played to death in pubs and public parks. Photographs featured "Jumbo and the American," "Jumbo in private," "Jumbo in public," "Jumbo with his howdah," "Jumbo without his howdah," "Jumbo in chains" and "Jumbo in freedom."

In February 1882, preparations began for Jumbo's transatlantic voyage. The first attempt to lead him from the zoo was futile. Upon reaching the streets, the elephant was apparently so frightened that he turned to go back. Finding the gate closed he lay down and bellowed pitifully.

Matthew Scott, who had been Jumbo's keeper from the time he was brought from Paris, had been asked by Barnum to continue in his position and to accompany the behemoth to America. Now Scott tried to induce Jumbo to rise, but to no avail. Davis

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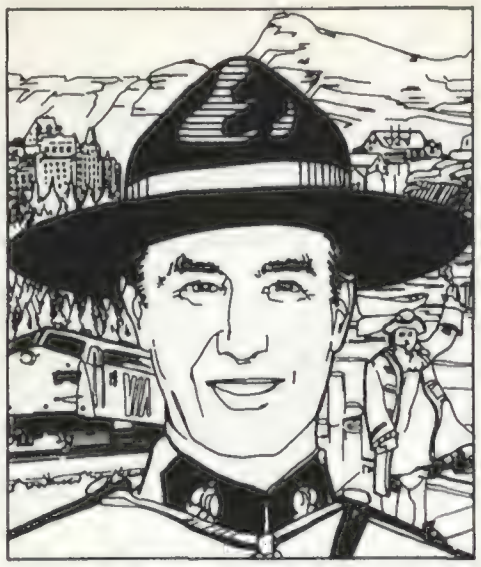

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cabled New York: "JUMBO HAS LAID DOWN IN THE STREET AND WON'T GET UP. WHAT SHALL WE DO?" Barnum cabled back, "LET HIM LIE THERE A WEEK IF HE WANTS TO. IT IS THE BEST ADVERTISEMENT IN THE WORLD."

Next day, the gates of his paradise were opened and Jumbo ambled back to his old quarters, while all concerned devised a plan to move the beast. An immense wheeled cage was built with doors at each end. In order for Jumbo to pass from his zoo enclosure to the outer air, he was forced to go through the contraption.

Finally, with much coaxing, Scott persuaded the elephant to follow him through the conveyance. For several days this trick was repeated until the day before his scheduled departure. This time, as he entered the cage, the door behind him was swiftly closed, then the door in front of him. Jumbo was ready for his journey.

It was a bleak, raw day in London, brisk and cold. A touch of snow was in the air. A large crowd had gathered at the zoo to bid farewell to their beloved beast. Scott and Davis supervised the workers while six constables stood by to manage the crowd.

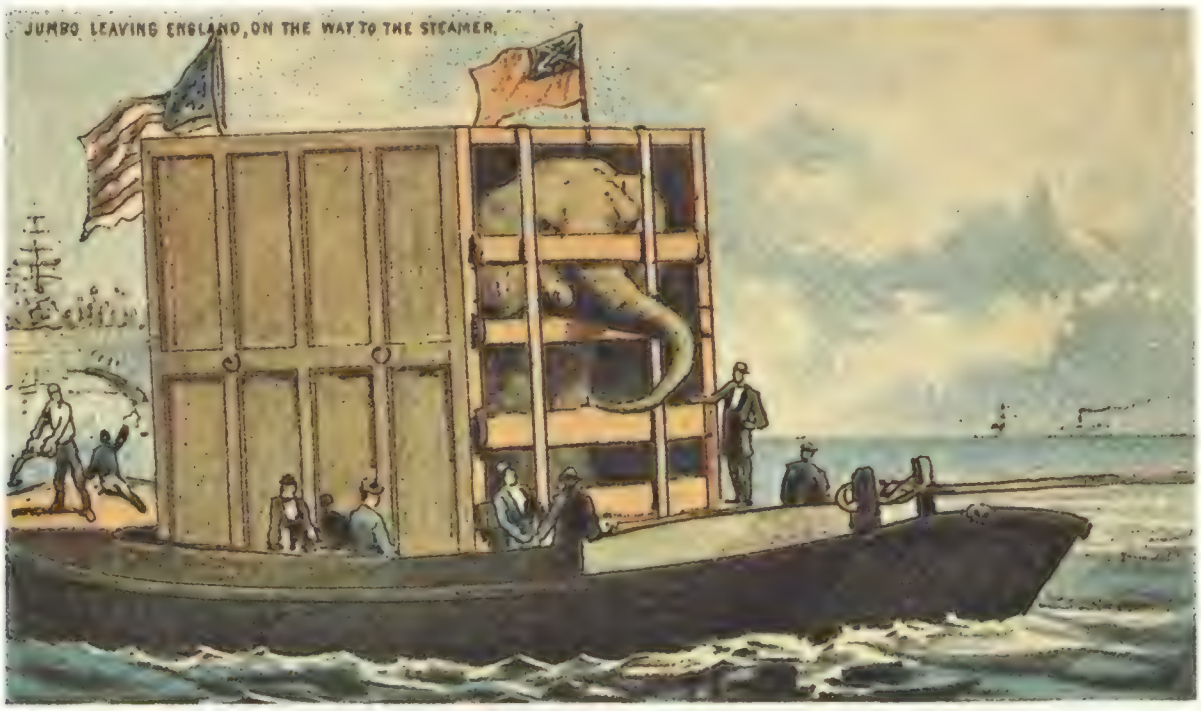
The ponderous wheeled cage became mired while still inside the zoo grounds, and several attempts were made to dislodge it without success. The gathered crowd shouted with joy at the failure. At one point, the jostled Jumbo, unnerved by the commotion, trumpeted defiantly, temporarily scattering the assemblage.

At last the cage was wrenched from the mud and the sad procession to St. Katharine Dock ensued. A team of ten horses drew the elephant. The street people shouted "Good-bye, Jumbo! Good-bye, Scott old fellow!"

As the procession filed through the streets in the wee hours, the echo of horses' hooves on cobblestones, the clattering of chains and occasional baleful trumpeting from Jumbo roused people from their beds to their windows. As they gazed out they viewed a sign defiantly displayed on the side of the cage: "Barnum, Bailey and Hutchinson, New York, U.S.A."

At just 5 A.M. the legendary elephant arrived safely at the docks. There were no demonstrations, no riots and no crowds.

Soon, Jumbo in his cage, weighing a total of about 12 tons, was ready to be hoisted aboard a barge, which



Card shows Jumbo's specially built wooden crate aboard barge under tow to *Assyrian Monarch*.

A message from one of the nation's leading authorities on utility securities...

HEALTHY UTILITIES CRUCIAL TO NATION'S SMALL SAVERS

By Sanford I. Weill

Chairman, Shearson/American Express Inc.

"Sandy" Weill is chief executive officer of Shearson /American Express Inc. and chairman of the executive committee of its parent company, American Express Company. The nation's fastest growing major financial services firm, Shearson /American Express serves more than 600,000 active investors around the world.

From my perspective, the financial health of the investor-owned electric utility industry is crucial to America.

Business and industry are dependent upon adequate, reliable power at the lowest possible price. Without it, the companies in which our clients invest could not prosper.

Emerging industries could not grow, and basic industries would disintegrate. Essential programs to rebuild the nation's industrial plant and increase productivity would be doomed.

$340 Billion Needed

Electric utilities will have to spend about $340 billion in the remainder of this decade to increase the efficiency of existing facilities, reduce dependence on petroleum fuels and build the minimum capacity required to meet tomorrow's power needs.

At least half that capital will have to come from outside investors. For utilities, probably more than any other kind of business, that means being able to attract the savings of individuals.

Small savers traditionally have invested in utility stocks to preserve capital, to obtain dividend income that at least kept pace with inflation, and to build equity in a stable and essential institution.

Utilities benefited not only from the use of funds invested directly by shareholders, but from increased borrowing capability that a strong equity ownership base provided. As a result, the industry could build the world's most reliable energy delivery system.

However, during the 1970s, economic conditions and the failure of state regulatory commissions to respond adequately to those conditions had a serious effect on utilities and their shareholders.

Regulatory commissions, trying to insulate consumers from the full impact of inflation, kept authorized utility returns below those of competitive investments, such as money market funds and government securities.

Individuals seeking to preserve their savings by investing in utility stocks instead saw their capital eroded. Dividend payments, after adjustment for inflation, have actually declined.

Consumers Subsidized By Shareholders

In effect, utility shareholders were subsidizing consumers of electricity, and the securities markets responded accordingly.

To attract new capital, utilities have been forced to issue stock at prices below book value, causing dilution of the equity ownership of existing shareholders. The portion of utility earnings required to pay dividends has climbed precipitously, leaving less to be reinvested in the system.

Current low market prices, in relation to book value, make some utility stocks attractive today, particularly those of companies in states where the regulatory environment apparently is becoming more reasonable. Action at the Federal level which enables shareholders to defer taxes on reinvested dividends provides an additional incentive.

But a great deal still must be accomplished to overcome the negative impact of the regulatory policies of the last decade.

Returns Must Be Competitive

Not only must authorized returns be high enough to compete with other investments, but the regulatory climate must enable utilities to earn those returns. Rate proceedings must be speeded up, and the proportion of cash earnings to non-cash credits included in returns must be increased. Mechanisms must be put into place that permit utilities to recover current financing costs for construction projects.

When utilities can attract new savings without diminishing the investment of existing shareholders, they in turn can make the capital investments necessary to assure adequate, reasonably priced power in the future.

Sanford I. Weill

This is one of a series of messages sponsored by the Edison Electric Institute, representing the investor-owned utilities that deliver 77% of the nation's electricity.

Participating independent authorities are not paid for these messages, but present them because they believe the issue is of critical national significance. EEI welcomes your comments.

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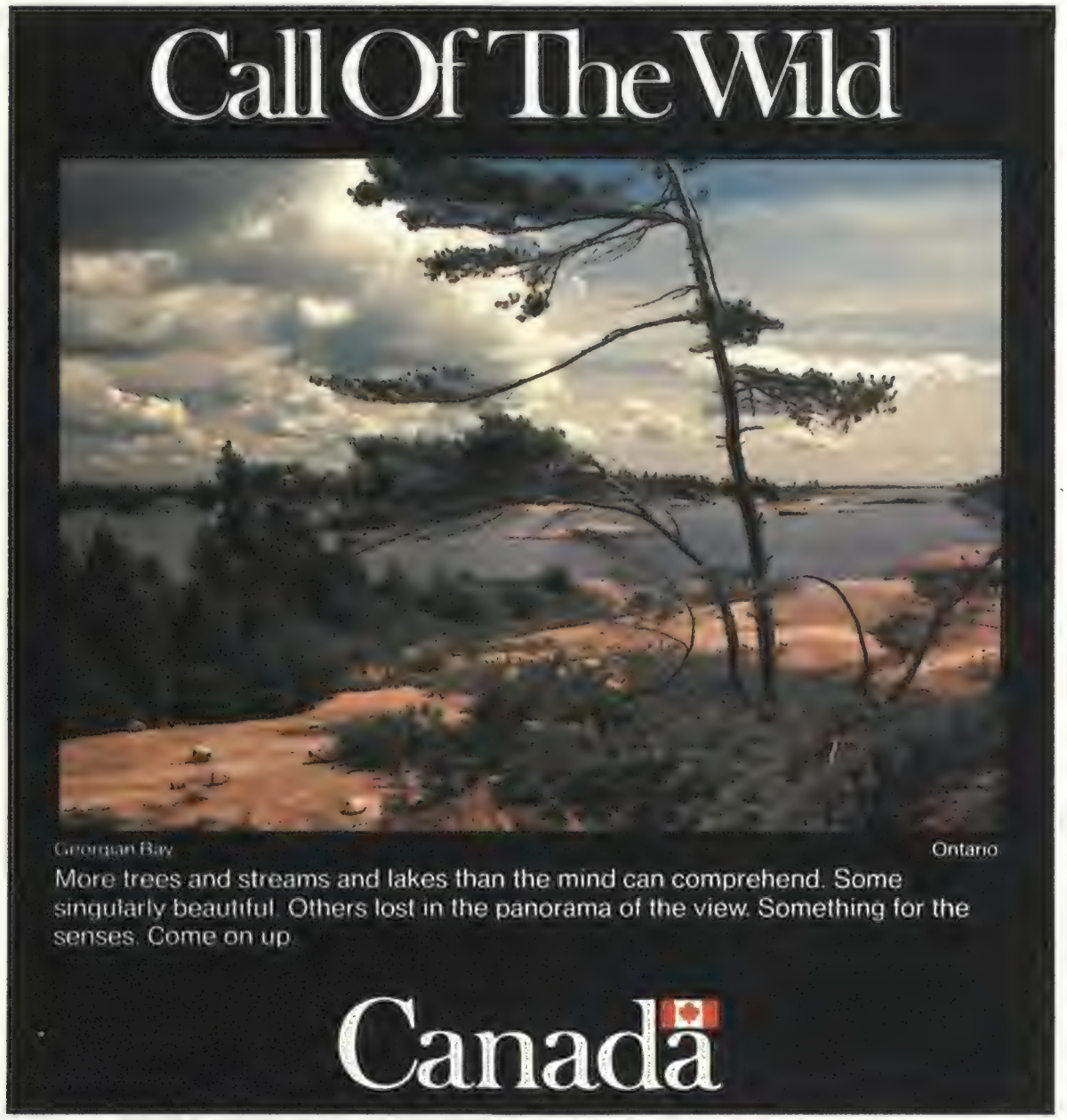
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Jumbo communes with trainer, Matthew Scott, who went with him to New York.

would then transport him to the transatlantic steamship *Assyrian Monarch*. He was, however, to receive one last tender tribute. Early that morning, an elderly spinsterish lady had arrived at the zoo to present him with a last bun. Alas, she was too late, for Jumbo had already departed. The determined lady then walked some seven miles to the docks and approached the porters at the gate. Tearfully she told of her journey. Finally an appeal to a constable gained her admission.

She triumphantly passed through the gates as if they were the portals of heaven and headed straight for the elephant. And Jumbo, upon seeing her, reportedly trumpeted and extended his trunk. Then from her reticule, she pulled out not his favorite buns, but two quart bottles of beer. She poured their frothy contents into his trunk which he then transferred to his mouth. After that she fed him buns and tearfully bade farewell.

At high noon, the barge was tugged downriver and Jumbo was transferred to the steamship. Two days later, perhaps America's most

celebrated immigrant—up to that time—sailed for New York.

On April 9, 1882, Easter Sunday, the ship dropped anchor in New York harbor and Jumbo was given a triumphant welcome. Not only were P. T. Barnum and company waiting for him at the Battery, but thousands of spectators gathered in doorways, on rooftops and in the windows of Lower Manhattan to witness the disembarkation. The *New York Times* declared that there was more excitement in the city "than there would be in London if Queen Victoria's imperial knee was swelled to twice its royal size." Toughs, dudes, pickpockets and police hung on the outskirts as "the multitude burst into a roar of applause which almost shook the City to its foundations. . . ."

Barnum was taken to the ship by tender to view his treasure. The captain escorted him to the elephant's quarters, where Matthew Scott greeted the great impresario and reported on Jumbo's health. Despite the popular notion that elephants do not get seasick, Jumbo had been decidedly under the weather for several

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COLONIAL Williamsburg
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days of his argosy. Barnum spotted dozens of cases of champagne, beer and whiskey, and Scott reported that kind passengers had sent these along with buns. One lady provided 12 dozen oysters, which Jumbo apparently consumed with gusto.

A large floating derrick removed the cage from the steamship and 16 horses began the task of hauling Barnum's prize uptown to Madison Square Garden (pp. 134-135). Up Broadway the strange procession went, followed by an elated crowd. At 1:20 A.M., the procession finally arrived at the entrance to Madison Square Garden.

Barnum had invested about $30,000 in the purchase and transportation of Jumbo. He recouped that sum in less than a week after he placed the elephant on display. Every performance in Manhattan was sold out. To emphasize the animal's enormous size, the showman displayed him alongside a baby elephant.

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Garden from all over the country. One newspaper reported that the elephant was particularly fond of onions. Within a week, truckloads of onions were delivered. After a while, gifts became less practical: fine cigars, crocheted potholders, even a sewing machine. Perhaps the ultimate tribute came from a young woman who bore a child weighing ten and a half pounds and named him Jumbo.

The following year the Brooklyn Bridge was completed and scheduled for opening. Barnum offered Jumbo to test its strength. Trainer Matthew Scott led the elephant across the span as thousands gazed from towers and the banks of the East River. The bridge survived the crossing, although according to author Neil Harris, "Scott worried lest the elephant begin to dance, for each of his footsteps caused loud vibrations."

Many consumer products bore his name. A tooth-whitening manufacturer proclaimed that his product was used to whiten Jumbo's tusks. The Willimantic Thread Company boasted that their spools of thread were strong enough to pull Jumbo (p. 140). And all the while Jumbo continued to beguile children and adults alike at performances in Manhattan and on the road. During the ensuing three years, more than four million children and 16 million adults paid to see him.

And then on Tuesday, September 15, 1885, the terrible tragedy occurred. The Barnum and Bailey circus was presenting its evening performance in St. Thomas, Ontario. During the final hour of the spectacle, as was customary, the 31 elephants in the show were loaded onto the circus train. Only Jumbo and little Tom Thumb, a "clown" elephant, had yet to embark. Trainer Scott was leisurely leading the two along the main line of the Grand Trunk Railway, when he was horrified to see an unexpected freight train speedily approaching. Scott frantically tried to get Jumbo off the track, but there was no time to get him out of the way of the oncoming locomotive. The engineer saw the elephants before him, threw the engine into reverse and called for the brakes. The steel wheels screeched and sparks flew from the

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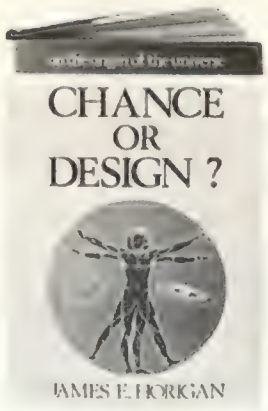

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CHANCE OR DESIGN?
James H. Horigan — $13.95

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Poor Jumbo lies dead at Ontario track where train engine struck him.

rails. But, alas, it was too late. Jumbo received the full impact of the collision and died of a skull fracture and internal injuries. Tom Thumb was injured but survived.

Barnum released the news with these words: "At about 9 o'clock on the evening of September 15, Jumbo, the biggest, noblest, most famous, popular, and valuable of beasts, was killed." (Barnum found it good public relations to claim that Jumbo was intent on pushing Tom Thumb to safety.) The news was cabled all over the world, and millions of people felt they had lost an old friend. Although deeply saddened, Barnum had previously arranged for Professor Henry A. Ward, head of Ward's Natural Science Establishment in Rochester, New York, and America's leading taxidermist, to mount Jumbo's hide and prepare his skeleton for exhibition. Ward and two assistants began their grim task. The hide weighed more than 1,500 pounds, the bones another 2,400.

After the great animal's death, Barnum imported Jumbo's "companion," Alice, from London and displayed her, rather grotesquely, beside Jumbo's skeleton and mounted hide. Actually, the two elephants had never mated. Alice later died in a fire.

Fire also did for Jumbo's hide. Mounted, it eventually went to Tufts University (p. 152), where Barnum was a trustee. Until it burned a few years ago, students would feed pen-

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nies into the trunk for luck on exams. Tufts teams are still called "Jumbos." The skeleton ended up at New York's American Museum of Natural History, but is no longer on display.

The arrival of Jumbo in America couldn't have occurred at a more propitious time. During the late 19th century, as described in Harris' biography of Barnum, mushrooming cities and interest in Darwin's theory of evolution resulted in the establishment of many municipal zoos. Bird- and animal-protection societies proliferated, and stories often imbued animals with wisdom, loyalty and courage. America had indeed been ready for Jumbo.

Never before had one single animal been seen by so many millions of people. Estimates of his American friends run as high as 20 million. In London, perhaps another ten million had seen and doted on Jumbo. A century after his death, Jumbo remains the most beloved animal ever to have roamed the Earth.

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Jumbo at Tufts, where he became school mascot. Fire destroyed hide in 1975.

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Author-artist-wizard Kit Williams holds the rabbitlike terra-cotta case in which the treasure was buried.

By Israel Shenker

A hound-and-hare sequence broke the *Masquerade* code

Ken Thomas let his dog out of the car for a rest stop—and solved the world's weirdest treasure hunt

When Ken Thomas struck gold the shock was so great, the stress of his long search so severe, the overexposure from nights of digging so extreme, that he went right into a hospital. During a fortnight there, his mind churned with anagrams, riddles, puzzles, mysteries, codes and clues—none of which should come as a surprise. He was one of thousands—hundreds of thousands?—obsessed by the treasure hunt set off by the book *Masquerade* (SMITHSONIAN, December 1980). But *he* succeeded where all others failed and found the treasure: the gold-fretworked, jeweled hare preserved in wax, encased in terra-cotta, and buried somewhere in Britain.

Since *Masquerade* was published, first in England then in the United States by Schocken Books and subsequently in many other countries, it has sold a million and a half copies, inspired a musical and established itself on best-seller lists—for 43 weeks in America. Superficially resembling a children's book with magically surrealistic landscapes, all embellished with phantasmagoric creatures defying Earth's pull to know heaven's delights, the text tells of Jack Hare's scamper through earth, air, fire and water to deliver a precious jewel from the moon to her beloved sun.

Kit Williams, the English artist and author of this idyll, adorned it with clues in paint, prose and poetry that could lead to the fiendishly hidden 18-carat hare. The lure of that glistering prize brought out so many treasure hunters that it threatened to turn England's fair countryside into pockmarked rubble.

Thomas tried twice to cure his obsession with the hunt, each time giving away his copy of *Masquerade*. Then he bought a third copy, and went right back to puzzling, computing, probing for flickers of inspiration, digging for dear life. His initial break came with a clue accompanying the first illustration. Each painting is bordered with words, several letters of them in red. Below the first illustration is the enigmatic intelligence "ONE OF SIX TO EIGHT," with the H in red. Thomas decided this referred to Catherine of Aragon, first of six wives of Henry VIII. Together with the H, the other red letters spell out HARE. Tiny cross marks ornament six letters that, suitably juxtaposed, are GOLDEN.

In the next painting, crossed hands point to the dates March 21 and 22—suggesting the equinox. But Williams is an alchemic artificer, and he strewed this playground not only with such genuine clues but also with red herrings. On a

Moon's messenger to Sun, Jack Hare adorns a page of maddening clues.

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painting of the town of Tewkesbury—a false clue—he included a soccer field with 16 numbers on it. These, it turns out, are atomic weights, and taken in sequence the symbols for the corresponding atoms read: FAlSEs NOUU ThINK AgAIN. (There is no chemical symbol W, hence NOUU instead of now.)

Two other numbered squares, appearing in other pictures, considered as atomic weights, convert to gibberish. But in the painting of the "penny-pockets lady," the numbers form the magic square of artist Albrecht Dürer (1471-1528). Combinations—each row, diagonals, inner squares, et cetera—add up to 34, provided that 7 is supplied for the blank space. Take the artist's initials: K is letter 11, W, 23, they add up to 34. Seen as 1 plus 1 plus 2 plus 3, they total 7. That *is* a clue, though Thomas never solved it, and didn't need to.

Having fixed on Catherine, he spent more than a year haunting Kimbolton Castle in Cambridgeshire, where Catherine died in 1536, which has since become a girls' school. Nocturnal prying was risky, but Thomas emerged with nothing worse than raging frustration.

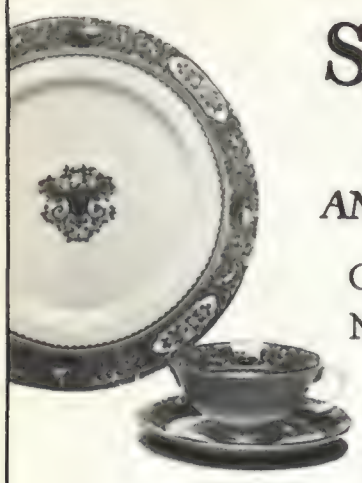
So he put clues aside and set his mind to work. Williams would have buried the treasure in a place he knew well, Thomas reasoned. An old art review indicated that in 1972 Williams lived in the village of Steppingley. Thomas drove there, scouted about fruitlessly and started for home. Three miles from Steppingley he let his dog out in the park at Ampthill, and the animal bounded off. Following on foot, Thomas came to a pair of tall stone crosses. One was a war memorial; on the other was a poem by the 18th century's Horace Walpole:

In days of old, here Ampthill's towers were seen./The mournful refuge of an injur'd Queen./Here flow'd her pure but unavailing tears./Here blinded Zeal sustained her sinking years.

A nearby stone, honored by the dog's devotions, bore a plaque with words from Psalm 104: *"O Lord, how manifold are thy works . . . the earth is full of thy riches."* Surely that was a hint! No, Williams said later, only a happy coincidence.

Near the cross erected in 1773 to commemorate the Ampthill sojourn of the injur'd Catherine of Aragon, Thomas set

The author wrote SMITHSONIAN*'s original article on Kit Williams'* Masquerade.



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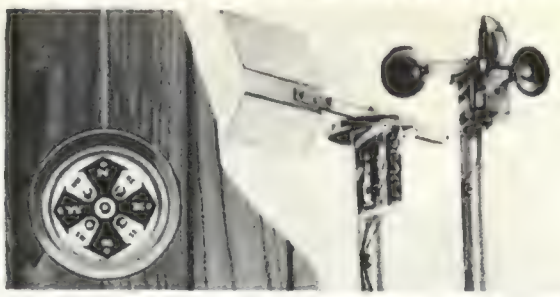

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to work when night fell, digging into a rabbitlike mound. Not there, the hare. A friend then helped him calculate where the tip of the cross' shadow would fall at noon on the equinox, and Thomas moved there. Finally he wrote Williams asking if it made sense to persist, and enclosed a rough map that would make sense only to Williams (in the wrong hands, the map would be incomprehensible). Williams phoned at once to confirm the solution.

Thomas returned to the site, dug a hole eight feet by four feet, four feet deep. No luck. Despairing, he called Williams, who agreed that he had buried the hare at the equinoctial tip of the shadow, and said he had then paced off the distance from the cross—20 steps, heel to toe. His shoes were 11¼ inches long. That made 18 feet and nine inches. Thomas returned, dug again. Still nothing. By this time Williams was terrified that someone had made off with the treasure, which could make the whole *Masquerade* enterprise appear a hoax. "I'll be roasted alive," he lamented.

Thomas agreed to have one more try. In daylight he spied signs of fresh digging nearby, and, frantic less someone else snatch the prize, threw caution to the winds, got poles and red plastic tape, erected an enclosure and at once set to work in the glare of day. To curious passersby he explained he was investigating reports of subsidence. Finally he struck pay dirt, and he realized he had dug up the treasure unknowingly the previous night—and thrown it back while refilling the hole! His immediate reaction was an Anglo-Saxon expletive, following which he pocketed the treasure and began filling in the hole again. When a company of soldiers came by, he brazenly got them to help tramp down the earth. Back and forth they marched, like recruits of the silly old Duke of York, who marched his men up the hill and down again.

Williams had asked if he could be there for the unveiling of the hare, so when Thomas emerged from the hospital just before the Ides of March, a small group gathered at Catherine's cross. Buffeted by wind and staggered by the gravity of the moment, they watched as Williams plunked the treasure into an aluminum saucepan over a portable gas stove. Fire burned and cauldron bubbled, wax melted, lid lifted, hare emerged.

It was the end of the trail, but not the end Williams had foreseen. He thought

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it would require solving the master riddle to produce the key sentence of about 20 words, for which such phrases as "ONE OF SIX TO EIGHT" would be mere confirmation. "Thomas got it through logic, really," says Williams, "but also, dogged determination."

Whether people will go on buying the book now is any publisher's guess, but a new prize will probably be offered to the first person to crack the master riddle. In any case, there are now two new mysteries. First, what will Thomas do with his hare? At auction it might fetch a fortune. The second mystery is Thomas. That is not his real name, of course; goodness knows if he has a real name, little being what it seems in this masquerade. He turned up only for the unwaxing, concealing any authentic clues beneath an elaborate disguise of magic squares, then escaped into the night. He said he feared harassment by other Masqueraders, but that may be only a cover story. All that has been learned about Thomas is that, according to his own account, he is English, an engineering designer and 48 years old. Now 48 is 34 plus 14, which is 7 plus 7, which means, well, what does it mean? Double, double toil and trouble, as well as choicest Anglo-Saxon.

Not unlike a medieval alchemist, Kit Williams holds his masterpiece, uncovered.

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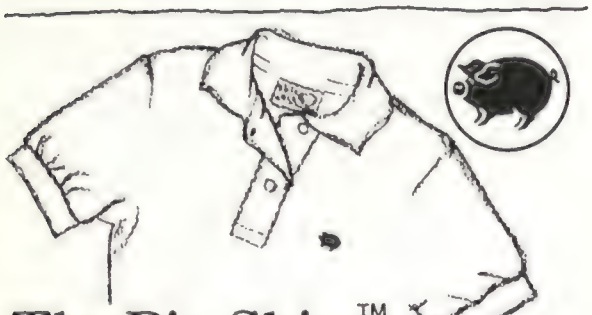

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Book Reviews

Käthe Kollwitz: Graphics, Posters, Drawings
Edited by Renate Hinz. Foreword by Lucy R. Lippard. Translated from the German by Rita and Robert Kimber. Pantheon Books, $23.50; paperbound $12.95

"I have never worked coolly but always, as it were, with my blood," Käthe Kollwitz wrote in her diary. This declaration was both true and typical of her. She scorned impartiality, detested complacency. As this survey reproducing 132 of her graphic works shows, Kollwitz consistently used her talent to remind her smug, militaristic society of its outcasts, the powerless working class. The themes she staked out were motherhood, the life of the proletariat and its accompanying privations, war and death. Her self-portraits have become documents of 20th-century world art.

Unlike that of so many artists who began as radical social critics when they had little to lose, and retreated to blandly centrist positions once their own prosperity was assured, Kollwitz' commitment to reform and mass action was lifelong. Born into a family of socialist intellectuals in 1867, Käthe Schmidt was educated in economics, philosophy, literature and history. At 14 she was sketching the dock workers and boatmen in her native Königsberg.

In 1884 she moved to Berlin for formal instruction. She met and eventually married Karl Kollwitz, a physician, and bore two children. By rights she could have retreated into marriage and ease. Instead, Kollwitz taught etching and drawing and made prints that caused a sensation.

On February 28, 1893, a day Kollwitz described as a "milestone" in her career, she saw a performance of Gerhart Hauptmann's *The Weavers,* which dramatized the misery of the Silesian weavers. She responded with a series of lithographs and etchings called "A Weavers' Rebellion." They were submitted to the Great Berlin Art Exhibit of 1898. She won the gold medal, but the Kaiser overruled the jury's decision, proclaiming that art "should not make the misery that exists appear even more miserable than it is." This made Kollwitz more famous than would the awarding of any prize. Exhibitions, critical notices, catalogs and purchases by museums and private collectors followed with regularity. She remained a prominent public figure until 1936, when the Nazis banned her work.

Kollwitz was unique in that her pictures registered their protest from the perspective of the oppressed. The institutions and persons who inflict punishment are unseen—presumably the artist refused to waste even a line on them. Her choice of subjects was motivated by esthetic as much as humanitarian concerns. "Motifs chosen from this sphere," she said, "offered me, simply and directly, what I felt to be beautiful. . . . The movements of the proletariat were . . . large and expansive." (Judging by this and other passages from her journals, Kollwitz was a provocative thinker as well as powerful artist and a complete edition of her diaries and letters would be an important contribution.)

Self-portrait of Kollwitz as young woman

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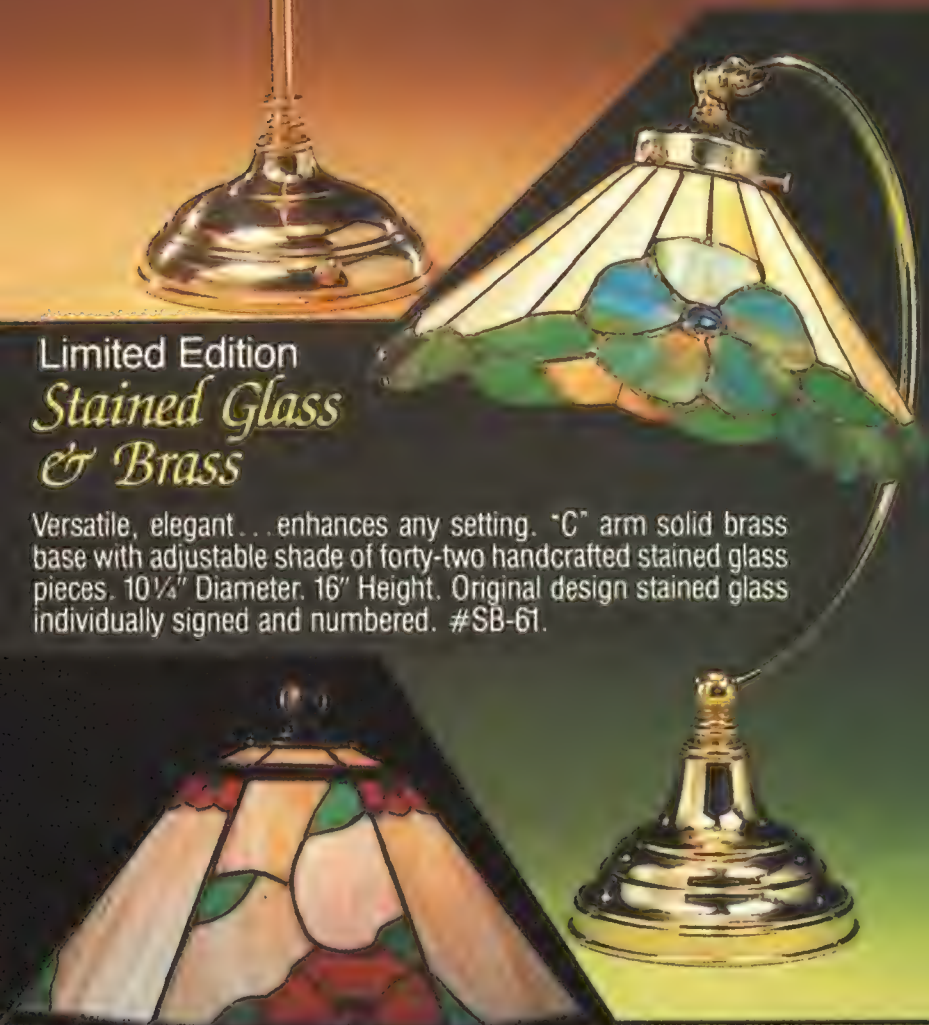

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World War I devastated Kollwitz. Not only was she sickened by the universal death and destruction, but her 18-year-old son Peter was killed in action. From then on she was a confirmed pacifist. Stylistically she changed, too. She lingered less over details, and her drafting became freer and more compressed. Kollwitz now focused on one or two human faces or figures rather than providing an entire scene to communicate her message. In the 1930s life around her grew so horrific that Death was portrayed as a comrade, a welcome alternative to the ghastly events daily presenting themselves. Yet the most powerful examples of Kollwitz' pessimism are her self-portraits.

Käthe Kollwitz died in April 1945, before V-E Day, before Hiroshima and Nagasaki. Her art—jarring, relentless, unforgettable—continues to speak with stinging particularity.

Avis Berman
New York-based free-lance writer and critic

On Learning to Read: The Child's Fascination with Meaning
Bruno Bettelheim and Karen Zelan
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to the publishers of inane textbooks and the teachers who use them as the unwitting source of this lamentable lack of true literacy. The texts by which children are taught often do no more than string together meaningless chains of words: "Janet and Mark. Come here, Mark. Come and jump. Come and jump, jump, jump." Texts like these, which use fewer than 100 words, are designed to teach children how to decode words. But as the authors persuasively argue, children must go beyond mere decoding to perception of meanings if they are to love reading and become truly literate.

By the time they are of school age most children have a large spoken vocabulary. In other cultures, such as Japan, children are given texts to read which reflect their vocabularies and interests; in this country children are fed a meager diet of silly, repetitious primers. In addition, most children have experienced frustration, sadness and anger, yet none of these emotions is depicted in American reading primers.

Inane texts are one problem. Another is the way the texts are taught. Teachers included in this study did not consider the role of the unconscious and the way it affects a child's reading. Bettelheim richly illustrates his thesis about the way children inject their own special meanings into the texts they read. One very competent first grader, whom Bettelheim observed, read "Tigger"—the name of the harmless character in the Pooh books—when she encountered the more ferocious "tiger." The teacher is apt to say that the child fails to recognize the word "tiger," and simply to correct her reading. Bettelheim's response is quite different. Rather than correcting the child, Bettelheim would engage the child in a conversation about tigers. He takes the child's point of view and thus encourages the child openly to acknowledge her feelings about the text she is reading.

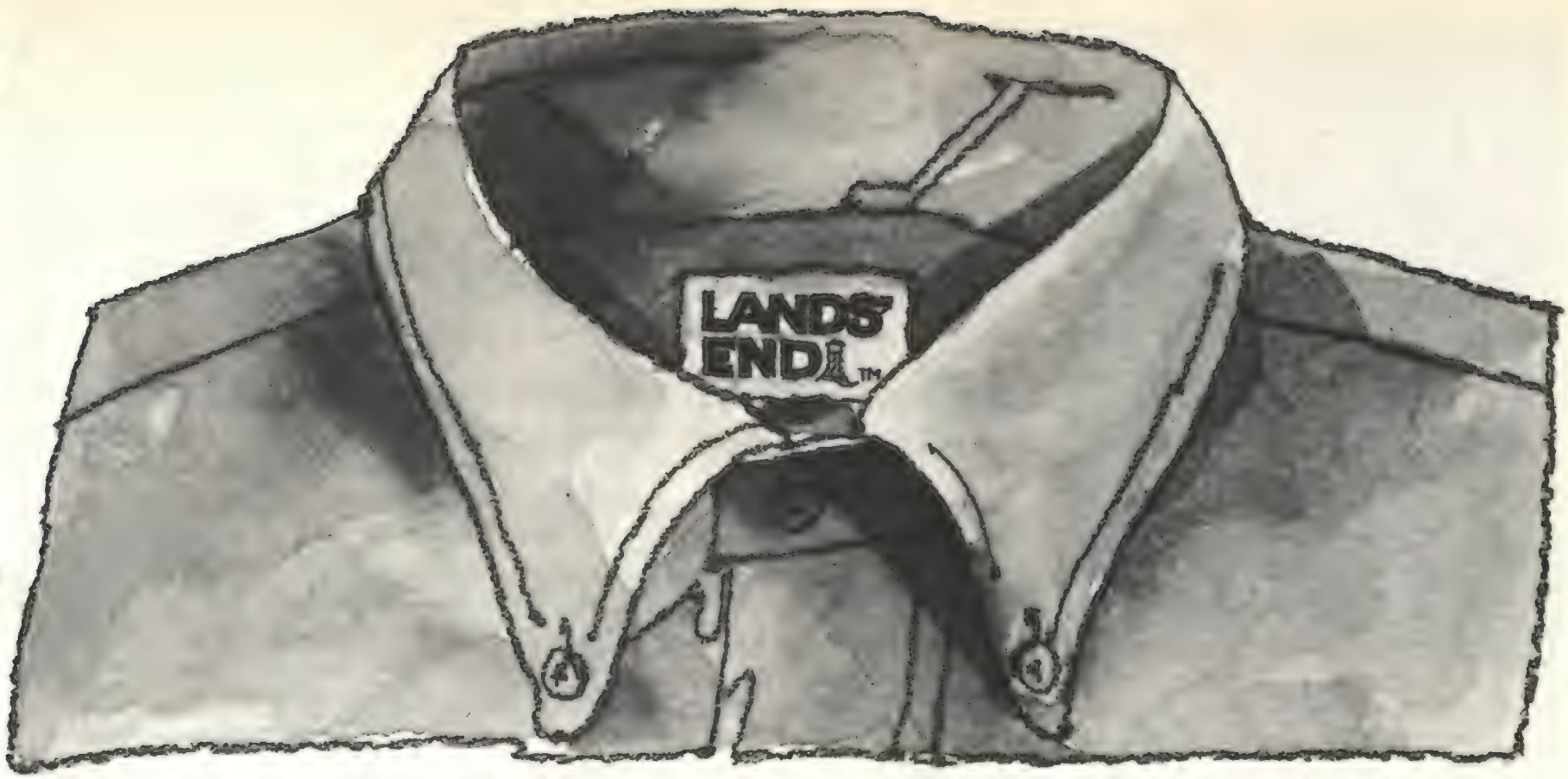
One might object that teaching first graders is not psychoanalysis, were it not for the startling results Bettelheim and his colleague received by using this approach. By engaging the child in a conversation about the text, the child is made to feel that the misreading has been understood. The child, Bettelheim discovered, was often able spontaneously to correct her own mistake and go on with the reading. Once we respect what is important to children, they become more inclined to pay attention to what is also of concern to the teacher—their ability to read without making errors.

Doubtless Bettelheim's method of teaching children to read will not work in all cases. But so persuasive are the examples in *On Learning to Read* that we can only hope more teachers and publishers respond to the call for better textbooks and better teaching methods.

Carrie McKee
Teacher, writer and reviewer

Lee: The Last Years
Charles Bracelen Flood
Houghton Mifflin, $14.95

A professional soldier most of his life, Robert E. Lee was to gain his greatest triumphs as educator and conciliator in the years after Appomattox. That is the main thrust of this compact biography, which treats in anecdotal detail the five years of the Confederate commander's service to Washington College in Lexington, Virginia.



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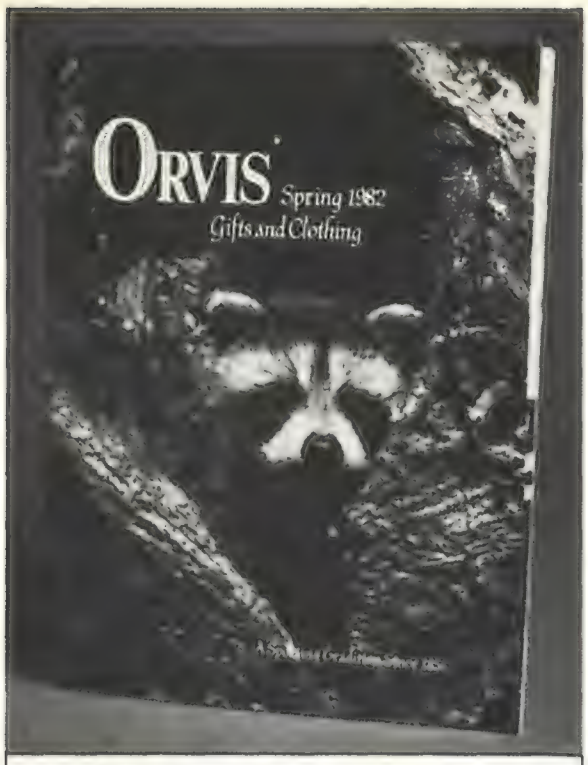

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It is paradoxical that a man who spent most of his days preparing for war, and fighting it, finally emerged as an enlightened and innovative educator. Lee saw the necessity for rebuilding the South; his college became an instrument toward that end. He added programs of mining engineering, industrial geology, agriculture and journalism to the curriculum—programs which were to flourish amid the liberal arts.

The programs didn't originate with Lee, but he had the vision to grasp, as Flood notes, the essence of a good suggestion and combine it with what already existed or was planned. He saw the interrelationship of history, law and politics—and 50 years ahead of other schools, Washington and Lee University (renamed after Lee's death) offered a course in international law.

As fund raiser, Lee had few peers. Capitalizing on his immense reputation throughout the land, he spoke in quiet and measured tones of the necessity to heal the wounds of war and get on with the business of educating young Americans for the task of rebuilding their shattered country.

Even diehard Yankees, who had bellowed "Hang Lee!" in the days after Appomattox, fell silent. Industrialists like Cyrus H. McCormick, who invented the mechanical grain reaper, came through with major financial contributions which put the college on a sound footing.

The *New York Herald* hailed Lee's "practical education" as the wave of the future and predicted that Lee "was likely to make as great an impression upon our old fogy schools and colleges as . . . in military tactics upon our old fogy commanders in the palmy days of the rebellion."

Readers are in Flood's debt for the abundance of anecdotes unearthed in his research. They offer fresh insights into Lee's relationships with students, family, political figures and comrades in arms.

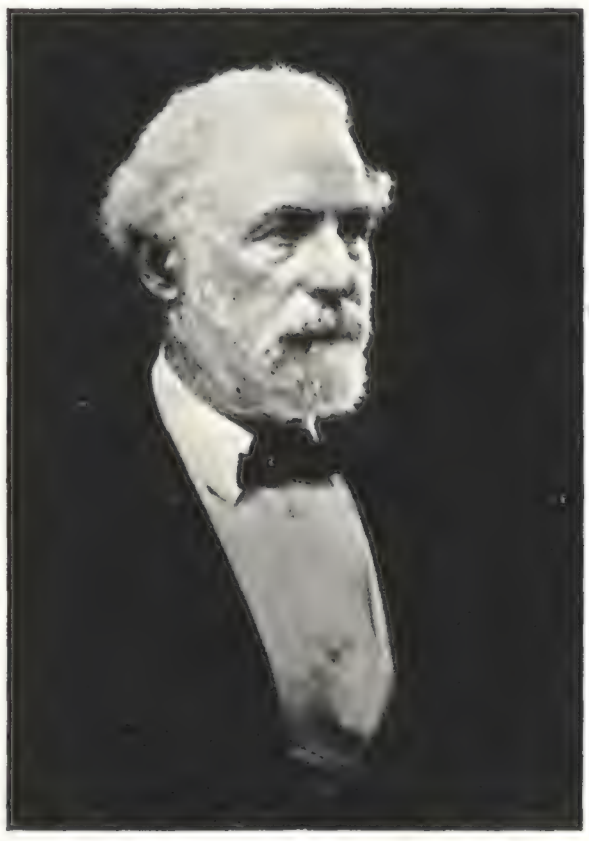
Lee was never to forget the kindness and consideration tendered him by Ulysses S. Grant in the surrender at Appomattox. Fearing humiliation and prison camps, he found sympathy and freedom: "to the end of his life [Lee] never allowed an unkind word about Grant to be spoken in his presence."

Lee's predilection to attack in battle, sometimes cited as a flaw by military historians, is illuminated by a chilly little postwar reunion with Maj. Gen. George E. Pickett, whose division had been destroyed in a final suicidal charge at Gettysburg. Three out of four of Pickett's 4,500 men were killed or wounded—and with them fell the Confederacy's last hopes of independence.

Col. John S. Mosby, the famous Confederate "raider," brought Lee and Pickett together. The meeting was glacially civil—and brief. Afterwards, Pickett exploded: "That old man . . . had my division slaughtered at Gettysburg." Mosby thought it over. "Well," he replied, "it made you immortal."

Excellent job offers were always coming Lee's way, offers that would have made him a wealthy man; but he preferred the relatively spartan existence of college president and a life devoted to working with students. In declining one such offer he lent eloquence to his philosophy of postwar life: "I am grateful, but I have a self-imposed task which I must accomplish. I have led the young men of the South in battle; I have seen many of them die on the field; I shall devote my remaining energies to training young men to do their duty in life."

Those energies were fast ebbing. Lee was suffering from hardening of the arteries and in his last months he suffered from constant chest pain. On October 12, 1870, he died quietly at home in Lexing-



Picture of Lee taken five years after Civil War shows much-aged son of the South.

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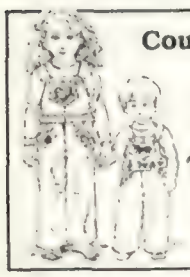

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ton. The last words he was heard to utter: "Strike the tent!"

Lucien Agniel
English Department
Davis and Elkins College

The Hut Six Story: Breaking the Enigma Codes
Gordon Welchman
McGraw-Hill, $12.95

The author, wartime head of Hut 6—the World War II British intelligence operation at Bletchley Park—has written a generous and absorbing account of the activities of the people directly concerned with successfully decrypting German military, air and naval signals that had been enciphered by "Enigma machines."

He describes the intellectual meritocracy which dominated the work at Bletchley Park and makes the point that in 1940, when England stood alone, it was the binding set of shared values and their common resolve that impelled the staff to achieve improbable successes.

Belated recognition is given to the motorcycle dispatch riders who, at great peril to themselves, carried bundles of raw texts from the intercept stations along blacked-out country roads to Bletchley, 47 miles north of London. Also described as critical to the undertaking are the 2,000 or more members of the Women's Royal Naval Service (Wrens), whose task was to feed intercepted Enigma messages into the electromechanical batteries of machines known as "bombes."

Despite the ominous threat of a German invasion, unintended humor came to Hut 6 on the eve of the May 1940 assault on France. When all of England was feverishly preparing for the worst, the Foreign Office took time out to register its maternal indignation on first learning that Bletchley proposed to put unchaperoned women on the night tour with men—a reassuring note that in England there was still high regard for Victorian virtue, in war as in peace.

In an interesting aside, Welchman notes that although intelligence derived from the decipherments did little to affect the outcome of the German rampage through France, it did give a clear sense of the scope of the debacle, and perhaps set in motion the mobilization of the fleet that evacuated most of the British Expeditionary Force from Dunkirk.

Unlike many previously published accounts, *The Hut Six Story* provides a lucid explication of the essentially cerebral sequence of steps that made eventual decrypting possible. Among its attributes are the principles of intelligence which Welchman adduces. For example: it is "dangerous to depend only on the expertise of professional cryptologists." The point is supported by his account of an audit by German experts who surveyed the security of the Enigma system in 1941 and pronounced it not vulnerable to successful attack by cryptanalysis. (The report of their survey was decrypted and read with great interest at Bletchley.)

A second principle deals with the danger inherent in a preoccupation with technology that gives a kind of false comfort. The design of an Enigma machine allowed as many as 200 trillion combinations. The British entry into the system was not to be a pure cryptanalytic victory, but the result of German errors, logic, psychology, intuition and traffic analysis. A full chapter is devoted to "Herivel tips" and the "Sillies" provided by the laziness, carelessness and lack of discipline of the German operators who gave Bletchley the much-needed keys to the enciphered German traffic. Although the machinery was of high quality, the inviolable procedures governing its use were not.

After the war, Welchman came to the United States and worked on U.S. and Canadian military communications and warning systems, many of which were technically dazzling but somehow did little to assure him of their reliability. The narrowness of Britain's edge in 1940 has made him particularly sensitive to the need for timely planning. He has noted, firsthand, the worrisome and widespread conviction that superior technology will somehow secure our safety. The absence of coherent thought, compounded by chronic discontinuities in the development of advanced systems, has given us machines which have increased our vulnerability to technical deception.

Welchman puts it simply: "As for military threats, we may well conclude that the conduct of war is very largely a matter of communicating true and false information, and of recognizing which is which."

Hut 6, with its trestle tables, folding wooden chairs and colored pencils, makes the point that, in the end, it is the quality of the people that wins the day.

R. T. Crowley
Writer on intelligence topics

The man from Gdansk.

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Chinabound: A Fifty-Year Memoir
John King Fairbank
Harper & Row, $20

By the time his daughter-nurse hurriedly advises him, "Daddy boy, just lie down, take it easy," one might understandably wonder if anything untoward ever happens in the life of John King Fairbank—Sinologist, the author of some two dozen books, historian and, above all, Harvard professor.

Even at the moment when he seeks his daughter's professional assistance because he is having a "massive coronary heart attack," the only moments he does not record in coolly pleasant reportage are those when he is unconscious.

Coolness and pleasantness are Fairbank's handmaidens as he glides down a memory lane that passes through one of the most monumental political and social upheavals in the history of mankind.

Perhaps what Fairbank is demonstrating in his 50-year memoir is that the real pro can always make it look easy, even when the subject at hand is the Communist revolution in China. Fairbank was there, observing, interpreting, recording and now recalling the transformation of the world's most populous nation.

Like many bearers of bad news throughout history, Fairbank was not appreciated in his own country for his early warning during World War II that Mao Tse-tung and the Communist Party of China were ascending while America's ally Chiang Kai-shek and his Kuomintang were sliding into corruption. "The primary conviction that I took back to Washington in 1944 was that the revolutionary movement in China was inherent in the conditions of life there and that it could not be suppressed. . . . Chiang Kai-shek has nothing adequate to oppose [it]."

For his efforts at meeting Chinese intellectuals and stockpiling data, Fairbank was raked over the coals of postwar anticommunism by the late Senator Joseph McCarthy, along with others whose sin it was to disagree with him. But unlike some of them—Alger Hiss, Owen Lattimore, John S. Service, John Paton Davies, Edmund Clubb—McCarthyism rolled off Fairbank's back. "My livelihood and security were never at stake," he says.

In fact, Fairbank used the McCarthy era and the subsequent Cold War well. With China closed to him, Fairbank and a small coterie of academics at Harvard and other universities turned inward—to study history, polish their language ability, stock libraries and otherwise develop the field of Sinology in this country.

In the process, by observing that Chinese scholars had not shown up at an international conference he attended in Moscow in 1960, Fairbank became one of the first Americans to realize the significance of the split between China and the Soviet Union. But, once more, he was ahead of his time and the United States was not to act until 1972, when President Richard Nixon traveled to Peking.

Looking back over all that history—the names of everyone who *was* anyone in this country and China—his sweeping contribution, he tells us with tongue in cheek:

"Shucks, fellahs, it was easy! Just get in on the ground floor between the world's greatest revolution and the world's greatest university—it's a pianola!"

Lewis M. Simons
Washington Post reporter

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Additional reading

Eskimo art (p. 50)

Inua: Spirit World of the Bering Sea Eskimo by William W. Fitzhugh, Susan A. Kaplan, Smithsonian Institution Press, 1982

The Eskimo About Bering Strait by Edward W. Nelson (reprint), Smithsonian Institution Press, 1982

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The Airmail: Jennies to Jets by Captain Benjamin B. Lipsner, Wilcox & Follett (Chicago), 1951

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Struggles and Triumphs: or, The Life of P. T. Barnum (Vols. 1 and 2) by P. T. Barnum, Knopf, 1927

Humbug, The Art of P. T. Barnum by Neil Harris, Little, Brown, 1973

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Classical Treasures, No. 8015: $35.95 (32.00 Assoc.) (s/h $2.50)

American Musical Theater

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Irving Berlin himself plays his favorite instrument in this reconstruction of the marvelous 1919 Follies, with such unforgettable stars as Eddie Cantor, Bert Williams, John Steel, and the comedy team of Van and Schenck. No. 2009: $8.98 ($7.98 Assoc.) (s/h $1.50)

Lady, Be Good!

George Gershwin is at the keyboard (accompanied by Fred Astaire's tap dancing) in such hits as "Fascinatin' Rhythm," "Half Of It Dearie Blues," and "The Man I Love." And if one piano isn't enough, Gershwin introduces the duo piano team of Arden and Ohman in this popular musical! No. 2008: $8.98 ($7.98 Assoc.) (s/h $1.50)

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Cole Porter plays the piano (what else!) and sings his ever-popular "You're the Top," "Be Like the Bluebird," and "Anything Goes" on this original cast recording of the 1934 shipboard musical comedy, starring Ethel Merman. No. 2007: $8.98 ($7.98 Assoc.) (s/h $1.50)

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Jazz Highlights

New! **Art Tatum: Pieces of Eight**

Enjoy the elegant sounds of solo jazz piano in an album of jazz and popular classics from virtuoso pianist Tatum, including "Love for Sale," "Jitterbug Waltz," "Somewhere Over the Rainbow," and eleven more. No. 2029: $8.98 ($7.98 Assoc.) (s/h $1.50)

Teddy Wilson: Statements and Improvisations, 1934–1942

Esteemed jazz pianist Wilson performs here in small groups, vocal accompaniments (Mildred Bailey, Billie Holiday), and twelve rare solo performances, including "Smoke Gets in Your Eyes," "These Foolish Things," "More Than You Know," and twelve more. No. 2005: $8.98 ($7.98 Assoc.) (s/h $1.50)

Music of Fats Waller & James P. Johnson

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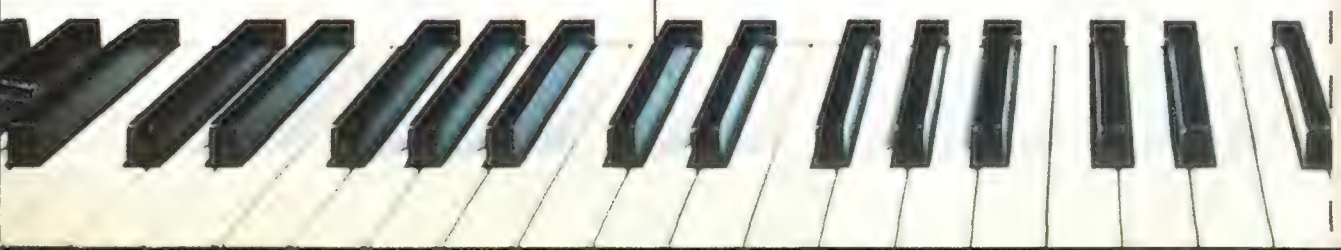

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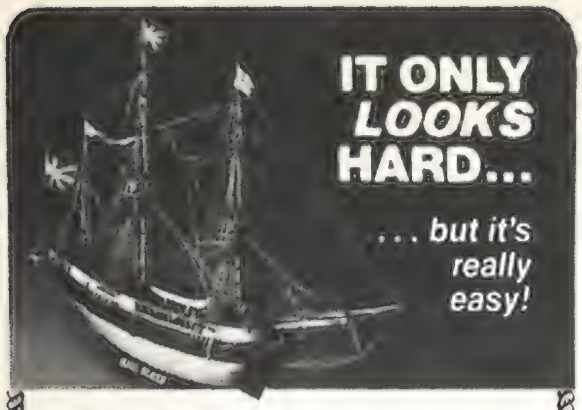

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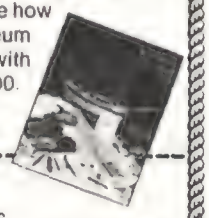

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Smithsonian highlights

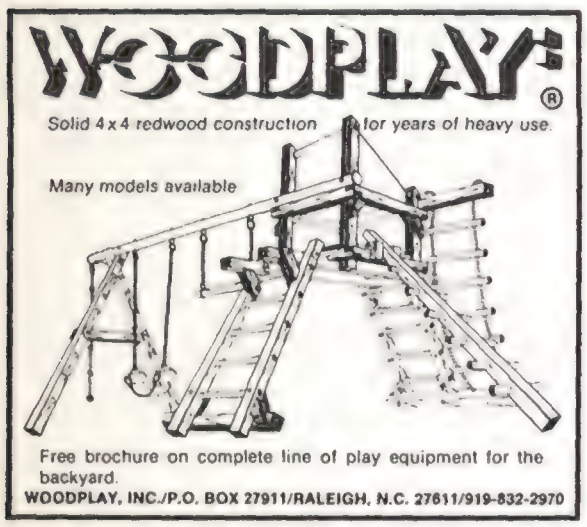
Now that Spring has come, you can enjoy the company of the animals at the National Zoo until 8 P.M., the ones outdoors, that is—the buildings close at 6 P.M. Also observing extended hours is the Air and Space Museum, open until 9 P.M. through Labor Day.

If you're in New York, you have a few days left to see the Cooper-Hewitt's unusual exhibit of architectural drawings from the Accademia di San Luca in Rome. The Accademia, now an archive, was a school of fine arts established in 1595. A student recently wrote of the 18th-century drawings in the exhibition: "One can easily say they are of interest only to the trained 'specialist' but . . . I watched with delight even small children gazing with wondering eyes at minute horses and carriages, sailing ships and fantastic lighthouses—and meditated with wonder myself upon the timelessness of the human imagination."

Special May events

National Air and Space Museum
Aerodynamic Design (May 21, 7:30 P.M.) Designer-businessman Burt Rutan talks about home-built aircraft.
The Universe Through the Eyes of the Space Telescope (May 19, 7:30 P.M.) Lecture, Spacearium.
Plot a Planet (May 1, 9 A.M.) Monthly sky lecture on measuring orbits.
U.S. Army Helicopter Championship Honors 1981 winning team.

Hirshhorn Museum & Sculpture Garden
Samuel Murray (May 20-July 18) Sculptures by this turn-of-the-century realist from HM&SG's comprehensive collection.
De Stijl, 1917-1931: Visions of Utopia (through June 27) More than 250 works from this influential Dutch movement (SMITHSONIAN, February 1982).



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Freer Gallery of Art
Winter into Spring: American Landscapes (through May 31) Nineteen works exploring the theme of seasonal change.
Chinese Paintings: Recent Accessions (through June 30) Religious, legendary and secular figure scenes.

National Museum of American Art
Awards in the Visual Arts I (May 7-August 8) Some 50 works by ten winners of U.S. competition for artists (p.128).
Prints and Multiples: 79th Exhibition by Artists of Chicago and Vicinity (May 27-August 22) Theme of multiple originals; includes woodcuts, etchings, lithographs.
Sculpture of Frederic Remington NMAA circulating exhibit, Amon Carter Museum, Fort Worth, May 7-July 4.

Renwick Gallery
Celebration: A World of Art and Ritual (through June 1983) See p. 181.
American Porcelain Renwick circulating exhibit, Phoenix Art Museum, May 7-June 27.

Cooper-Hewitt Museum (New York)
The American Landscape (through July 18) Late 19th- and early 20th-century artists (p. 178).
The Jacquard Loom: Recent Experiments (May 18-August 22) Fabrics produced by contemporary fiber artists on this traditional loom.
Architectural Fantasy and Reality (through May 9) Drawings from the Accademia di San Luca in Rome.

National Museum of African Art
The Stranger Among Us (through July 1) Traditional art depicting strangers on the continent since the 15th century.
Thinking with Animals: African Images and Perceptions (through July 1).
Black and White in Color (May 1, 3 P.M.; May 2, 2 P.M.) Award-winning film.

National Portrait Gallery
American Portraiture in the Grand Manner: 1720-1920 (through June 6) Monumental works.
FDR: The Early Years (through July 25) His entrance into the political arena.

National Museum of American History
G. Washington: A Figure Upon the Stage (through January 11) Major exhibit interpreting this complex personality.
Franklin Delano Roosevelt: The Intimate Presidency (through summer) Focuses on his special communications techniques.

National Museum of Natural History
Contemporary American Indian Art (through summer) Some 100 artists.
The Tarahumara (through June 13) Bronzes, pastels by George Carlson.

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Smithsonian events

For price information and tickets to Resident Associate events, call 357-3030:
Ethel Scull and the Acquisitive Taste (May 12, 8 P.M.) Lecture on today's art.
Art and Music of Venice (May 15) All-day seminar on the Republic's splendor.
Imperial Russian Palaces (May 22) All-day seminar on the days of the czars.
The Epic John Reed (May 4, 6 P.M.) Professor Richard Stites discusses the legendary journalist and subject of *Reds*.
Winemaking from Grape to Glass (May 11, 8 P.M.) Lecture, film and tasting.
Josiah Wedgwood and the Turning Point of Modern Pottery (May 3, 6 P.M.).

For information and tickets to Division of Performing Arts events, call 357-1500:
Rev. C.A. Tindley (May 7-9) A musical revue saluting this black American composer of gospel; part of weekend colloquium (call 287-3391 for schedule).
Country Music (May 16, 8 P.M.) Gala with Kitty Wells, Johnny Wright, Bobby Wright and Tennessee Mountain Boys.
American Musical Theater (May 21-23) Song, dance and some special surprises.

Regional events

The Regional Events Program will visit Nashville May 2-9 and Santa Barbara May 14-21. Lecture topics include orchids, art, plate tectonics, palms, gems, air and space, and nocturnal animals. Area associates should have received invitations by now. For information write: Regional Events, 1208 A&I, Smithsonian Institution, Washington, D.C. 20560.

Radio Smithsonian

Among the topics covered this month by Radio Smithsonian are spiders, women pilots, Nellie Bly, evolution, jazz, the African Diaspora and ham radios. To find out which area stations carry these programs, write: Smithsonian Office of Telecommunications, A&I 2472, Washington, D.C. 20560.

Smithsonian Institution Traveling Exhibition Service

SITES circulates exhibitions to hundreds of cities. To sponsor a show in your community, write to SITES, Smithsonian Institution, Washington, D.C. 20560. Here are some May exhibits:

Little Rock (May 8-June 6) *Images of Labor,* Arkansas Art Center.
Fort Myers, Florida (May 1-30) *Photographs from the National Portrait Gallery,* Edison Community College Gallery.
Winter Haven, Florida (May 8-June 6) *Know What You See: The Examination and Treatment of Paintings,* Polk Community College.
Ames, Iowa (May 8-June 6) *A Collector's Eye: The Olga Hirshhorn Collection,* Iowa State University.
Iowa City (May 15-August 1) *Western Views and Eastern Visions,* University of Iowa Museum of Art.
Minneapolis (May1-30) *Black American Graphics,* University of Minnesota.
St. Joseph, Missouri (May 8-June 6) *World Print III,* Albrecht Art Museum.
New York City (May 8-June 20) *American Icon: The 18th-Century Image of George Washington in Prints and Illustrations,* Fraunces Tavern Museum.
Wheeling, West Virginia (May 8-June 6) *Know What You See: The Examination and Treatment of Paintings,* Oglebay Institute Mansion Museum.

Membership benefits

A pre-visit packet, designed to help Associates planning a Washington visit, is free; send postcard request or phone Associates Reception Center, Smithsonian Institution, Washington, D.C. 20560 (202-357-2700 or, for hearing impaired, TDD 202-357-1729). Allow two weeks for receipt.

Through Labor Day, the National Air and Space Museum is open 10 A.M. to 9 P.M. daily; most other Smithsonian museums are open 10 AM.. to 5:30 P.M. daily. The warm welcome at the Associates Reception Desk in the castle 10 A.M. to 4 P.M. includes details about benefits—a slide/lecture orientation to the 13 Smithsonian museums; dining in The Court, the members' restaurant; relaxing in the Associates Lounge; and discount privileges.

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†Transportation, local taxes and dealer delivery charges additional.

Celebration and how to do it

A major exhibit at the Renwick shows how people of the world express their hopes, sorrows and joys of life

Fittingly, the new Renwick exhibition, "Celebration: A World of Art and Ritual," offers us not only the chance to see a ceremonial mask, but to see one dancing. Along with spectacular objects from all over the world, the Smithsonian Office of Folklife Programs, cosponsor of the exhibit, has planned a series of live, open-to-the-public celebrations. Among the festivities will be a Big Drum celebration from the Caribbean island of Carriacou, a Passion Play scheduled for Easter 1983, a drama marking Juneteenth—celebrated in the South as the day slaves were freed—and Tet, the Vietnamese New Year.

Such events are only a few of the international backdrops behind the more than 600 objects in the exhibition. Some of the descriptions make the guidebook as fascinating as the art. It tells us how various cultures celebrate personal passages such as birth, puberty, marriage and death, as well as feasting and drinking, myths, history and even sports. Most of the objects were collected by travelers and are being exhibited for the first time by the Smithsonian. They demonstrate at once the uniqueness and universality of what Man does when he is moved to celebrate.
Carol Simons

Apaches signified girl's entrance into puberty with this buckskin cape, worn for four days of ceremonies.

Hyena mask from northwestern Zaire is worn at manhood celebration; dancer crouches low, is concealed by fringe.

At a Bengali wedding in India, when couple dresses as god and goddess, groom wears a headdress like this one.

Ornate spinning wheel from Nepal; a Newari bride carries one to a shrine and asks the deity to bless her craft.

Yoruba musicians of Nigeria can make this pressure drum praise a stranger or announce the news.

Mexican dance mask represents Malinche, Cortés' interpreter and mistress, and inspires both derision and admiration.

Join with other Smithsonian Associates

Travel and Study, at Home, Abroad . . . and

As a Smithsonian Associate, you can enjoy the benefit of culturally oriented experiences under the guidance of museum curators or visiting scholars. Your lively curiosity and broad interests have resulted in a comprehensive study program to meet many tastes and budgets.

Domestic Study Tours

Boston June 23-27: Study the city's Colonial past and vibrant present with walking tours and visits to historical properties and museums.

Family Sampler June 24-27: Special program for parents and children (ages 7-14) at Smithsonian museums and the zoo.

Glacier/Waterton National Parks July 8-17: Hike scenic trails through forests and meadows. Accommodations in park lodges.

High Sierra Base Camp July 17-24: Wilderness camping and hiking adventure.

Desolation and Gray Canyons July 21-31: Study Indian history on this exciting white-water trip on Utah's Green River.

Colorado Rockies August 1-7: Enjoy the outdoors and learn about the area's geology, botany and zoology.

Salmon River August 5-12: See bears, bighorn sheep and spectacular scenery while rafting in Idaho's wilderness.

Grand Canyon August 13-23 or August 27-September 6: A sublime spectacle, seen on a raft trip down the Colorado River.

Isle Royale August 20-28: Hike through the remote and pristine wilderness of this Lake Superior island.

Colorado Mining and Railroad History August 21-29: Trace the colorful Gold Rush Era from Denver to Durango.

Massachusetts Heritage August 21-30: Architecture, antiques, music and beautiful countryside from Boston to the Berkshires.

Canyon and Mesa Archaeology September 10-21: Enjoy autumn at Mesa Verde, Chaco Canyon and the Hopi reservation.

Pacific Northwest September 17-26: Visit Mt. Rainier, Olympic Peninsula, San Juan Islands and British Columbia.

Washington, D.C.: Power and Style September 21-26: See varied aspects of the capital, from the halls of Congress to private homes.

The Tetons October 4-12: Glowing with autumn colors, the magnificent peaks in this national park provide a backdrop for natural-history study.

Philadelphia October 6-10: Celebrate the city's 300th anniversary with this special in-depth tour.

North Carolina October 6-14: Enjoy local hospitality in the historic homes of Old Salem, New Bern and Edenton.

Great Smoky Mountains October 7-14: Camp, hike and learn about the pioneer history of North Carolina.

Chesapeake Birds October 8-16: From Chincoteague, Virginia, to Cape May, New Jersey, observe vast flocks of migratory birds.

Asheville October 14-18: Biltmore and historic homes—plus the World's Fair at Knoxville, Tennessee.

Washington "Anytime" Weekend: An economical and convenient way to visit your choice of Smithsonian museums for two or more nights at Loew's L'Enfant Plaza or Hyatt Regency. Package includes hotel, two meals, Tourmobile ticket, and exclusive tour of Smithsonian castle. Applications and payment must be received at least ten days prior to arrival.

Foreign Study Tours

These tours range in size from small group experiences to charter adventures and vary in price from low cost to deluxe, depending on the type of travel, destination visited and length of trip:

People's Republic of China 1982: New exclusive programs for travel with a Sinologist to learn about the art, ancient treasures, temples and bustling cities of this complex culture.

History and Romance of the Rhine May 17-June 1: Board our chartered boat for a cruise from Switzerland to The Netherlands, stopping at great castles, cathedrals and villages. Special excursions in Zurich, Basel, Strasbourg, Cologne and Amsterdam.

Yugoslavia May 21-June 5: From Dubrovnik, the remote southeastern region affords a rare opportunity to visit a rich variety of landscapes and monuments.

Alpine Countryside May 29-June 13: Two weeks in a charming Austrian mountain village.

Toronto June 21-27: Discover the exciting diversity of this city's art and architecture with walking tours, museums and theater.

Adriatic Shores August 28-September 9: MTS *Argonaut* cruise with experts to study the rich history and cultural heritage in Italy and Yugoslavia including Urbino, Ravenna, Venice, Zadar and Dubrovnik.

Historic Cities and Romantic Roads of Germany August 29-September 12: Munich followed by a choice of travel: south into the Alps, north to the Danube, or visit the Black Forest and the Rhineland.

Oxford/Smithsonian Seminar September 10-25: Medieval manuscripts and British photography are among in-depth courses taught by Oxford faculty. Stay in Worcester College with visits to Cambridge, Bath and Stratford for a performance.

Sailing the Greek Islands September 21-October 3: Set sail on the luxurious 317-foot, four-masted yacht *Sea Cloud* for an idyllic journey from Athens to Santorini, Crete and the coast of Asia Minor.

Amazon Passage September 30-October 16: Fascinating scenes of dense jungle, colorful birds, villages and river life on this voyage aboard the M.S. *World Discoverer*, traveling 2,000 miles from Belém to Iquitos.

England's Narrow Canals October 2-13: Cruise through renowned countryside on several famous canals, assist with the operation of the locks, and meet with local preservation groups.

Italian Contrasts October 3-17: An extended stay in Florence, with visits to Tuscany and Umbria; or, explore Venice and the Lake District.

Egypt and the Nile October 5-22: Visit Cairo, then cruise aboard chartered riverboat to explore spectacular sites.

Performing Arts of China and Japan October 16-November 7: The exotic sounds and color of Oriental drama; performances, theater schools and backstage visits.

Salzburg Seminar October 23-November 7: Stay in an opulent palace; study Baroque Era or Opera History. Museums, theater and concerts.

Kyoto Seminar November 5-21: Live Japanese style; visit shrines and gardens of Kyoto and Nara; study Japanese history.

The Ancient World of Peru November 10-26: Visit Lima, Cuzco, Indian markets and amazing Machu Picchu.

Coming in November . . . New Zealand and the Milford Track.

Write National Associates, A&I 1278 Smithsonian Institution, Washington, D.C. 20560 or call (202) 357-2477 for specific tour brochures

in Washington

Selected Studies Seminars

Enjoy the treasures of the Smithsonian in popular programs and special behind-the-scenes tours. Choose from:

In Tucson, Arizona

The New Astronomies May 9-14 and May 16-21: Springtime in Arizona at two of the most advanced observatories in the world —the Fred Lawrence Whipple Observatory and Kitt Peak National Observatory.

Lost World of the Maya September 26-October 1: George Stuart, renowned archaeologist at the National Geographic Society and author of *The Mysterious Maya*, sheds the latest light on one of the great epics of history—the rise and fall of the brilliant Mayan civilization—in illustrated lectures, decipherment workshops and tours of a famous collection.

Aircraft Restoration: How To October 3-7: The master craftsmen of the National Air and Space Museum share their many techniques in workshops at the Paul E. Garber Facility (formerly Silver Hill).

American Antique Furniture October 3-8: Connoisseurship of masterpieces, 1650-1840. Includes great collections, detection of fakes, care of antiques and tours of the Winterthur Museum and the elegant Diplomatic Reception Rooms at the Department of State.

Tibet: Lost Horizons October 17-22: The culture, history and art of this rich civilization, along with behind-the-scenes tours of the Freer Gallery and the best private Tibetan art collection in the United States.

China: A Cultural History October 24-29: Prehistory to the enigmas of today, with emphasis on the intellectual and artistic traditions and the great philosophies and religions. Includes recent films and tours of the outstanding collection of the Freer Gallery of Art.

Princes and Patriots: Flemish and Dutch Painting in the 17th Century November 14-19: Lectures and tours of the masterpieces of Rembrandt, Hals, Vermeer, Rubens, Van Dyck and other artists in the National Gallery of Art with Bill Kloss.

Coming:
Connoisseurship of Gems November 7-11

or (202) 357-2475 for seminar brochures.

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By Charles R. Larson

Yes, we have no tomatoes—as of today

Every year when the nights get shorter, the days warmer, the rains more frequent, I know it's that period again, and I don't mean any equinox. I dread the approaching season because I know that it's time to make a momentous decision: What am I going to do about tomatoes?

Am I going to go out and buy tomato plants? Spend the better part of four months fretting about how they're growing? Worry the whole time we're on vacation whether they're getting enough rain? Fight the May hailstorms, the June parasites, the July wilt, the August drought? Weed, fertilize, water, mulch, and give them the attention they always demand? In short, is this going to be another one of those years when the tomatoes are going to ruin my summer?

I'd like to chuck the whole thing and say I'm going to rely on store-bought tomatoes, but the problem is that I savor the taste of a nice, juicy red tomato. The things they pass off in the supermarkets these days have about as much similarity to the real thing as a hairless tennis ball. I've read those descriptions of tomatoes gassed to hasten their maturity. Well, all I can say is that they usually taste it.

Sometimes I think I'm a member of a secret organization, one of the decreasing number of Americans who remember what a genuine tomato tastes like. I'm talking about blood-red tomatoes, so tasty the juice squirts out when you fork them, not the tasteless imitations (anemic and pulpy) available in most stores about 12 months of the year. If you live in a privileged area, you can probably still get real ones for a few weeks toward the end of summer: locally grown, vine ripened.

The problem is that during those few precious weeks when real tomatoes are available (at about 65 cents a pound), the ones in my garden also ripen. So what's the point in spending all those endless months cultivating a half-dozen tomato plants that will produce, maybe (during a good season), 60 tomatoes? At roughly three tomatoes to a pound, that's a total of 20 pounds, or $13 at the grocery store—a bargain these days by any standards.

Two summers ago when I kept a record of my endeavors, I calculated that my own tomatoes cost about twice that amount. That was the year I fooled myself into believing I could beat the price at the grocery. First, there were the six tomato plants themselves at 30 cents each, or $1.80. Then the Miracle-Gro fertilizer, on sale for $3.19. Add to that the slug pellets ($2.29) and the tomato dust to keep away most of the other pests ($3.59). Plus the metal tomato cages, so that the vines wouldn't fall over from their expected weight—a real indulgence, I admit, at $1.99 each for a whopping $11.94. Granted, that last item was a bit of a luxury (impulse buying when I went to the nursery), but I assumed they would be used again, summer after summer. Thus, excluding the mulch and water and my own hard labor (and worries), my 20 pounds of tomatoes cost me $22.81, or $1.14 a pound, two summers ago.

This past summer I tried to take it easy—not to get so worked up over tomatoes—since I knew that I could always buy all the ones I wanted at my local grocery. I bought only three plants, thinking that I'd have an occasional tomato from my garden. The plants I bought this time cost 50 cents each, for a total of $1.50. The Miracle-Gro and the slug pellets cost more, too: $3.39 and $2.59, respectively. What I secretly hoped was that by lavishing my full attention on three plants instead of six, my rewards would be as plentiful as the year before.

Nature had other intentions. First it was too cold for the blossoms to form properly, then too hot. Midway through the summer, I knew that I'd lost out once again. Each plant produced one measly tomato, bringing my cost to $2.49 each!

And so my dilemma continues. Am I going to force myself to go through the whole humiliating ritual once again, or am I going to give in to the producers of the square-cut imitations?

I'd like to think there's some way I could escape this ordeal. It ought not to cost so much for each man to believe there's still a bit of the farmer left in him, that his sacred relationship with the earth can continue, but I suspect it's a losing battle. All it will take is another bad year of drought or wilt (let alone the flying parasites and the slugs) and I'll retreat a little farther from my garden. All too soon at a Labor Day picnic I'll be sitting, like everyone else, eating plastic tomatoes with a plastic fork. At least the juice won't squirt all over me, and maybe I'll forget the taste of the real thing.

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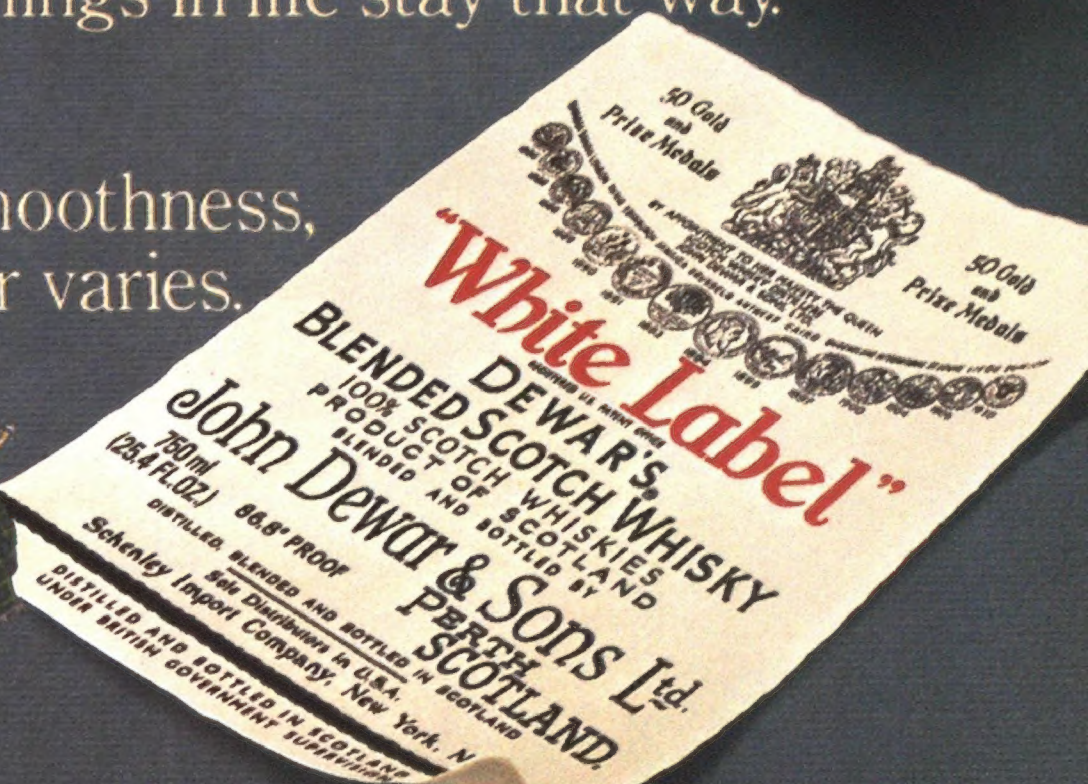

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